EXHIBIT J

Arens, Sue

From: Jorgensen, Jay T. [jjorgensen@sidley.com]
Sent: Monday, December 08, 2008 6:44 PM
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Subject: Letter re draft submitted to AEM

Attachments: American Society for Microbiology and Yale University 12-8-08.pdf; CRASecondReport-November25-08.pdf; Myoda signed.pdf; Report_Cowan.pdf

American Society for Microbiol... | CRASecondReport-November25-08.... | Myoda signed.pdf (417 KB) | Report_Cowan.pdf (818 KB)

<<American Society for Microbiology and Yale University 12-8-08.pdf>> <<CRASecondReport-November25-08.pdf>> <<Myoda signed.pdf>> <<Report_Cowan.pdf>>

Dear Professor Ornston and colleagues,

I have attached a letter and related scientific analyses relevant to a draft article submitted to Applied and Environmental Microbiology. The submission by J.L. Weidhass, T.W. Macbeth, R.L Olsen, and V.J. Harwood is entitled Identification and Validation of a Poultry Litter-Specific Biomarker and Development of a 16S rRNA Based Quantitative PCR Assay.

Please feel free to contact me with any questions or comments about these materials.

Best regards,

Jay Jorgensen

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December 8, 2008

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RE: Manuscript submission by Harwood *et. al.* (J.L. Weidhass, T.W. Macbeth, R.L Olsen, V.J. Harwood) entitled *Identification and Validation of a Poultry Litter-Specific Biomarker and Development of a 16S rRNA Based Quantitative PCR Assay*

Dear Professor Ornston:

I write to follow up on my letter of August 11, 2008. I represent some of the defendants in the pending lawsuit *Oklahoma* v. *Tyson Foods, et al.* (N.D. Okla.). The plaintiffs in that lawsuit retained the authors of the above-referenced manuscript and asked them to supply a scientific basis for plaintiffs' allegations of environmental injury stemming from the use of poultry litter as a fertilizer in the Illinois River Watershed ("IRW").

We understand that AEM has submitted questions to the authors and that those questions may have asked the authors to present a more complete data set. We also understand that the authors have submitted or intend to submit a revised manuscript. We have not yet had an opportunity to review any revisions to the current draft. However, as I noted in my prior letter, the defendants have worked with various experts to assess the plaintiffs' claims. On December 1, 2008, several of these experts submitted reports rebutting the alleged "biomarker" process described in the manuscript. At bottom, the defense experts' analyses concluded that the assertions in the manuscript are not scientifically supported. Because these reports may be helpful to you and your editors I am enclosing them for your review. I also provide brief summaries below.

Dr. Charles Cowan - Statistics

Dr. Cowan is the managing partner of Analytic Focus LLC, and previously served as Chief Statistician for the FDIC and as a Director at Price Waterhouse, among other posts. Defendants asked Dr. Cowan to review the statistical relevance of the sampling and testing the authors undertook to support their claim of having developed a poultry-specific biomarker. Dr. Cowan concludes that the authors' assertions are not based on sound statistics.

As you know, the authors' key allegation is that they have identified a specific bacterium that is unique (or at a minimum, highly correlated) to poultry. However, as Dr. Cowan explains, the authors failed to demonstrate how often the biomarker is absent from other animals. As a statistical matter, at the very most the authors' tests for specificity demonstrate that *up to 60 percent* of cattle could carry the biomarker. You may know that Oklahoma is one of the leading cattle-producing states in the nation and thus cattle are a likely source of any bacteria found in the environment of the IRW.

With regard to pigs, geese, ducks, and humans in the IRW, Dr. Cowan points out that the authors' sample sizes are too small to permit the drawing of any statistically meaningful conclusions. In other words, as a scientific matter the authors are unaware whether other (non-poultry) animals carry the alleged "poultry-specific" biomarker.

Additionally, Dr. Cowan concludes that plaintiffs' sampling regime was not statistically sufficient. He notes the importance of designing a sampling procedure that includes statistical standards as to how a sample is selected, the likelihood of selection of a unit in the sample, and methods to allow the extrapolation of the results of the sample to the target population. The authors did none of this. Rather, samples were taken in clusters without proper study of the target populations, which resulted in unrepresentative results.

Dr. Cowan concludes, given the authors' small sample sizes and sample collection methods, that "Dr. Harwood's findings are meaningless."

Dr. Samuel Myoda – Microbial Source Tracking

Dr. Myoda is Vice President at the Institute of Environmental Health/Molecular Epidemiology, and previously directed bacterial source tracking for the State of Delaware. The defendants asked Dr. Myoda to review Dr. Harwood's claim to have identified a previously unknown, poultry-specific "biomarker." Dr. Myoda's report identifies a number of procedural and methodological flaws in the work reflected in the manuscript. Dr. Myoda also reports on his

own independent testing. As noted below, that testing demonstrates that the authors' assertions are incorrect.

Dr. Myoda's report explains how the authors failed to demonstrate the specificity of their proposed "biomarker" to poultry. The authors overlooked the vast majority of species contributing fecal material to the IRW. The authors tested only a handful of animals and used too few samples to exclude even these species as possible sources of the alleged "biomarker" bacterium. In fact, the authors' own testing demonstrates the biomarker's non-specificity as the plaintiffs' experts derived the "biomarker" sequence from cattle, duck, and goose feces.[1]

Dr. Myoda's independent testing confirms that the alleged "biomarker" is actually widely present in the environment. Unlike the authors, Dr. Myoda cultured out the organism(s) that carries the alleged "biomarker" DNA sequence to determine the identity of these bacteria. The authors had already determined that their alleged "biomarker" could be identified by DNA sequence bands from *Brevibacterium avium* and *Brevibacterium casei*. Dr. Myoda further determined that these reproducible DNA sequence bands are also carried by other organisms including strains of *Brevibacterium epidermidis, Corynebacterium ammoniagenes, Panoea agglomerans, Exiguobacteriaum sp., and Lysinibacillus sphaericus*, none of which are specific to poultry.

Moreover, Dr. Myoda isolated the purportedly poultry-specific biomarker in a number of locations that have no relation with poultry feces. Dr. Myoda isolated it from clean bedding material (*i.e.* bedding material before the addition of *any* poultry feces). Dr. Myoda also isolated it from 16 of 16 goose flop samples, from additional water fowl samples colleted by EPA, from beef and cow hide samples, and from sand collected from a bacteria-impacted swimming beach in Kirkland, Washington. None of the materials in Dr. Myoda's testing came from areas or samples that had been impacted by poultry. In short, therefore, Dr. Myoda's testing confirms that the "biomarker" is not poultry-specific but rather is present in the environment.

Dr. Myoda's report also documents numerous procedural shortcomings that undermine confidence in the authors' work. His review of the plaintiffs' records and reports demonstrated repeated instances of improperly collected, shipped, stored, or labeled samples. The authors also routinely failed to follow standard methods, including those governing hold times, sample shipment, and the use of geomeans. Moreover, he concluded that plaintiffs' sampling program appeared biased both as to the location and the timing of sample collection. Indeed, sampling

[1] The original manuscript reported that the authors found the biomarker in one duck and one goose sample. But handwritten notes from Dr. Wiedhaas subsequently produced to the defendants indicate that a second goose sample also tested positive.

locations were selected in part by plaintiffs' lawyers, and were determined based on the likelihood that they would reflect what plaintiffs consider to be poultry impact.

Finally, Dr. Myoda's report discusses a number of methodological deficiencies in the authors' development of their purportedly poultry-specific "biomarker." For example, the authors failed to test for the presence of the alleged biomarker in poultry feces. Unless a correlation is established between the biomarker and fecal indicator bacteria or pathogens in poultry feces, the alleged "biomarker" is of no use as an indicator for poultry fecal contamination. As noted above, the authors did not culture or otherwise isolate the organism in question. Without having done so, it cannot be known how long it persists in different environments, or its fate and transport characteristics generally. The plaintiffs similarly failed to develop any meaningful correlation between the "biomarker" and fecal indicator bacteria and/or pathogens in poultry litter or anywhere else in the IRW. In fact, the correlation plaintiffs propose between the biomarker and fecal indicator bacteria incorrectly attributes all fecal indicator bacteria in the IRW to poultry. As Dr. Weidhaas observed in an e-mail to Dr. Macbeth, "there could be other sources of coliforms in the watershed that would contribute to the fecal material count, but that are not the poultry litter. This is not good for the litigation against poultry farmers (i.e., other sources of fecal material)...."

Mr. Jay Churchill – Sampling Procedures

I previously provided you with a report from Mr. Jay Churchill of Conestoga-Rovers, Inc. documenting deficiencies in the plaintiffs' sampling program. This sampling program produced the data upon which the manuscript relies. Mr. Churchill has now supplemented that report, noting numerous instances of plaintiffs' samplers intermixing soil samples from different depths, failing properly to decontaminate field instruments, taking soil samples directly through cattle manure, contaminating water sources prior to sampling, sampling water in proximity to cattle manure, failing to purge groundwater sources prior to sampling, and improperly mixing litter samples. Mr. Churchill also explains how, rather than establish and follow uniform sampling procedures, the plaintiffs instead repeatedly modified their "Standard Operating Procedures" to reflect sampling already performed. Based on his observations, Mr. Churchill concludes that the plaintiffs' sampling program did not produce reliable data.

* * *

I am sorry to have to trouble you, but as I indicated in my prior letter, plaintiffs will likely seek to introduce any article published by AEM as evidence to support the admissibility of their experts' conclusions. Plaintiffs have therefore placed AEM's peer review process potentially at issue. Accordingly, we again respectfully request that you and your peer reviewers preserve all

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materials relating to the manuscript, including any email, correspondence, records, data, or other documents relating to the article. For your convenience, I have attached a list of the kinds of documents that we are requesting you and your colleagues retain for the litigation.

Best regards,

Jay T. Jorgensen

encls.
cc w/ encls.: *Applied & Environmental Microbiology* Editors
cc w/o encls by e-mail only: Plaintiffs' Counsel

Documents Requested to be Preserved by AEM Editors, Staff, and Peer Reviewers

1. All drafts, including but not limited to electronic copies, printed, handwritten, or marked up versions, of any manuscript, article, letter, or any other writing (hereinafter "the manuscript") submitted for publication by Valerie Harwood, Roger Olsen, Tamzen Macbeth, or Jennifer Weidhaas, or anyone associated with the plaintiffs in *Oklahoma v. Tyson*.

2. All correspondence, including but not limited to written and electronic communications, between the Journal of Applied & Environmental Microbiology, its editors, employees, peer reviewers, and agents (hereinafter collectively "AEM") and any of the individuals identified in #1 regarding the manuscript.

3. All documents, including but not limited to electronic documents, handwritten notes, and memoranda, referring to, discussing, or showing the preparation of the manuscript.

4. All documents, including but not limited to electronic documents, handwritten notes, and memoranda, referring to, discussing, or showing peer review of the manuscript.

5. All documents, including but not limited to electronic documents, handwritten notes, and memoranda, referring to, discussing, or showing the submission of the manuscript to any other journal or publication.

6. All documents, including but not limited to electronic documents, handwritten notes, and memoranda, referring to, discussing, or showing the acceptance, rejection, or evaluation of the manuscript.

7. All materials generated during the receipt, peer review, and assessment of the manuscript including but not limited to data, samples, calculations, references, notes, drafts, and communications related to the receipt, peer review, and assessment of the manuscript.

8. All materials relied upon by the authors in the development of the manuscript including but not limited to published or unpublished references, data, samples, calculations, notes, drafts, and communications.

CRA SECOND REPORT

ILLINOIS RIVER WATERSHED
OKLAHOMA AND ARKANSAS

Prepared For:

Tyson Foods, Inc., Tyson Poultry, Inc., Tyson Chicken, Inc., Cobb-Vantress, Inc., Cal-Maine Foods, Inc., Cal-Maine Farms, Inc., Cargill, Inc., Cargill Turkey Production, LLC, George's, Inc., George's Farms, Inc., Peterson Farms, Inc., Simmons Foods, Inc., and Willow Brook Foods, Inc.

Prepared By:

Jay Churchill, P. Eng.
Conestoga-Rovers & Associates

NOVEMBER 2008
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1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) was retained in June 2006 by Tyson Foods, Inc., Tyson Poultry, Inc., Tyson Chicken, Inc., Cobb-Vantress, Inc., Cal-Maine Foods, Inc., Cal-Maine Farms, Inc., Cargill, Inc., Cargill Turkey Production, LLC, George's, Inc., George's Farms, Inc., Peterson Farms, Inc., Simmons Foods, Inc., and Willow Brook Foods, Inc. to review documents associated with the Illinois River Watershed (IRW) Sampling Activities, including a work plan prepared by Camp Dresser and McKee (CDM) entitled "Soil and Litter/Manure Sampling Protocol" [1] (CDM Work Plan); Standard Operating Procedures (SOPs) prepared by CDM for various sampling activities including Residential Well Sampling, IRW Groundwater Sampling, Spring Water Sampling, and Direct-Push Groundwater Sampling; Oklahoma State University (OSU) Cooperative Extension Fact Sheets (Factsheets); United States Environmental Protection Agency (USEPA) Standard Operating Procedures (USEPA SOPs); and Oklahoma Water Resources Board (OWRB) Water Quality Monitoring Program-Field Sampling Protocol for Water Quality Assessment of Streams and Rivers.

In addition to review of the above documents, CRA personnel provided oversight of certain field sampling activities conducted by CDM personnel on contract growers' farms pursuant to subpoenas and notice in 2006 and 2007, including a portion of CDM's soil, groundwater, surface/spring water, and poultry litter sample collection activities. CRA did not observe other field sampling activities conducted by CDM, including but not limited to edge of field surface water runoff sampling, small tributary sampling, sediment sampling, and Lake Tenkiller sampling. CDM was assisted by sampling personnel from a firm named Lithochimeia. The business relationship between CDM and Lithochimeia is not known to CRA. Additionally, the employment of the various sampling personnel is not known to CRA. Accordingly, hereafter, in this CRA Second Report, Illinois River Watershed, Oklahoma and Arkansas (hereafter, "CRA Second Report"), general reference is made collectively to "CDM" personnel collecting samples.

CRA field observations were compiled in field books, video recordings, photographs, and located using Global Positioning System (GPS) coordinates. Sampling issues observed by CRA during oversight of CDM's collection of soil, groundwater, surface/spring water, and litter samples pursuant to subpoenas and notice in 2006 and 2007 are identified in a report entitled "Report of Sampling Oversight Observations, Illinois River Watershed, Oklahoma and Arkansas" [2], prepared by Jay Churchill of CRA, and dated February 2008 (hereafter, "CRA Oversight Report", incorporated herein by

reference and attached as Appendix A *). In general, the CRA Oversight Report documents observed significant and material violations from the above noted CDM Work Plan, CDM SOPs, and the other referenced documents. The CRA Oversight Report concludes that as a result of CDM's field personnel deviating from written sampling protocols and procedures, or otherwise collecting samples using technically unsound procedures, the samples collected by CDM were compromised and/or otherwise unreliable and unrepresentative of conditions and therefore resulted in unrepresentative analytical results.

Mr. Churchill provided expert testimony as to the information presented in the CRA Oversight Report and CRA's field observations of CDM's sampling activities in the United States District Court for the Northern District of Oklahoma on February 22, 2008. Subsequent to Mr. Churchill's court testimony, on behalf of the State of Oklahoma CDM prepared two expert reports, one entitled "Report Concerning the Sampling Program for the Oklahoma Poultry Litigation" [3] (hereafter, "Brown Report"), dated May 15, 2008 and prepared by Darren Brown of CDM; and the other report (hereafter, "Olsen Report") untitled but referred to in the Table of Contents as "Olsen Expert Report" [4], and signed by Roger Olsen on May 14, 2008.

The purpose of this CRA Second Report is to respond to certain inaccurate or otherwise incorrect statements made in both the Brown Report and Olsen Report with respect to CDM field sampling activities that were observed by CRA (primarily the collection of soil, groundwater, surface/spring water, and poultry litter samples), and to provide additional information related to existing regulatory agency guidance documents and industry standards that were not followed by CDM, which therefore resulted in samples being collected by CDM for which the reliability and representativeness cannot be defended by CDM. This CRA Second Report also comments on statements made in transcripts of deposition testimonies of Darren Brown of CDM on August 26, 2008; Dr. Berton Fisher (expert witness of Plaintiffs) on September 3, 2008; and Dr. Roger Olsen of CDM on September 10 and 11, 2008.

Jay Churchill, P. Eng. of CRA has a degree in engineering, and over 20 years of professional experience in engineering, project management, design, and construction oversight of environmental projects throughout North America and in Puerto Rico. Mr. Churchill has collected numerous soil, sediment, surface water, groundwater, concrete core, wipe, sludge, and air samples in accordance with regulatory

* During preparation of this CRA Second Report, CRA identified two minor typographical corrections that should be made to the CRA Oversight Report, as follows: Page 1, fourth "bullet" item, revise "January 3, 2007" to read "January 2, 2007"; and Page 1, fifth bullet item, revise "February 5, 2007" to read "January 19, 2006".

agency-approved work plans and guidances at numerous sites. Mr. Churchill additionally has technical expertise in the agricultural field related to conservation planning, agricultural waste management systems, land treatment practices, nutrient management, and soil and water quality. Mr. Churchill provides project management and technical expertise to CRA's Agricultural Services Group and has been instrumental in the preparation of detailed reports, Comprehensive Nutrient Management Plans, work plans for agri-environmental projects, completion of environmental assessments for agricultural operations, and design review. Mr. Churchill's curriculum vitae is presented in Appendix B.

2.0 BACKGROUND

The principals of environmental sampling are based on published Standard Operating Procedures and protocols. The reason USEPA and other agencies have promulgated SOPs and protocols is to provide consistent methods for sample collection, thereby ensuring sample integrity and reliable analytical results.

For the purposes of the 2006/2007 IRW sampling activities the CDM Work Plan, CDM SOPs, and OSU Factsheets provided procedures and protocols for CDM field personnel to follow during sampling activities observed by CRA, including:

- Scope, Overview, and Application for Soil, Water, and Litter Sampling;
- Sampling Methods Summary;
- Sampling Procedures for Soil, Water, and Litter;
- Sample Containers, Preservation Techniques, and Quality Control; and
- Documentation of Sample Collection and Handling and Corresponding Field Details.

CRA field personnel observed repeated and material violations of the aforementioned SOPs and protocols and industry standards during oversight of the CDM sampling activities. In many instances CRA field personnel observed activities that resulted in direct cross-contamination of samples, presented the potential for unrepresentative analytical results, and showed disregard for established protocols. The manner in which samples were collected would indicate that CDM field personnel lacked the necessary training and experience to conduct the IRW sampling activities. This was evident in the underlying actions and poor adherence to the CDM SOPs and other accepted standard industry practice.

Other elements of a sampling program as extensive as the IRW investigation that typically would be implemented to, ultimately, support the reliability of the data generated from the investigation would be the establishment of good, clearly written SOPs; development and adherence to a Quality Assurance Project Plan (QAPP); proper training of field sampling personnel and associated documentation of training; adequate field oversight review; and proper documentation of the field activities conducted. As detailed herein, CRA also identified problems with CDM's IRW investigation with respect to these elements as well.

The purpose of developing and implementing high quality SOPs and a QAPP is to obtain objective, valid data. Personnel reviewing and making decisions based on the

data assume the data are valid, and are dependant upon data gatherers to do a good job in field sampling and collecting the data, and these activities are ensured by use of properly developed SOPs and a QAPP. The goal of any environmental sampling program should be to obtain high quality, objective data, rather than data of unverifiable quality as is discussed in this CRA Second Report. CDM cannot defend that CDM's deviations from CDM's written sampling protocols and procedures, USEPA guidances, and industry standards, or otherwise collecting samples using technically unsound procedures during implementation of the field sampling program resulted in representative sample analytical results for the IRW investigation.

3.0 SIGNIFICANT COMMENTS ON BROWN REPORT

The following comments are made on the Brown Report primarily with respect to CRA's observations of CDM's field sampling activities conducted during 2006 and 2007. However, additional related comments, some of which are based on a review by CRA of transcripts of deposition testimonies by Darren Brown of CDM on August 26, 2008; Dr. Berton Fisher (expert witness of Plaintiffs) on September 3, 2008; and Dr. Roger Olsen of CDM on September 10 and 11, 2008, also are made where warranted.

Brown Report, Page 1-2, "Summary of Sampling Program"

This section of the Brown Report appears to be intended to identify the various environmental sample media that were sampled as part of the State of Oklahoma's IRW sampling program. While the Brown Report lists a number of sample media (for example poultry litter, soil, and sediment) the report fails to mention that surface/spring water and groundwater samples also were collected by CDM. As documented in the CRA Oversight Report, CDM field personnel actions during sampling also allowed for collection of unrepresentative and contaminated groundwater and surface/spring water samples.

Brown Report, Page 1-3, "2.0 An Overview of Standard Operating Procedures"

This section of the Brown Report states that **"The purpose of a SOP is to provide a standard working tool that can be used to document technical activities as well as quality control and quality management."** This statement is incorrect, and is a misinterpretation or lack of understanding of a phrase from Mr. Brown's cited USEPA guidance document ["Guidance for Preparing Standard Operating Procedures (G-6)"] on how to prepare a SOP. CRA further disagrees with the content of CDM's statement regarding the purpose of a SOP, and believes this fundamental lack of understanding of USEPA guidance and industry practice could be a contributor to the reason there were numerous violations of SOPs during implementation of the field sampling program conducted by CDM.

A SOP is not intended as a method to document, after-the-fact, how an activity was conducted, as Mr. Brown claims above and as stated during Mr. Brown's deposition on August 26, 2008 (see page 32 of deposition transcript). What Mr. Brown describes would normally be considered in the environmental industry to be a "report". In fact, a SOP is a directive that establishes methods and procedures to be followed when completing certain activities, including but not limited to field sampling activities. As defined by **USEPA** in its guidance document entitled **"Guidance for Preparing Standard Operating Procedures (SOPs), EPA QA/G-6"** [5] (the document cited by

Mr. Brown), "**A Standard Operating Procedure (SOP) is a set of written instructions that document a routine or repetitive activity followed by an organization.**" The USEPA document also states that "**SOPs detail the regularly recurring work processes that are to be conducted or followed within an organization. They document the way activities are to be performed to facilitate consistent conformance to technical and quality system requirements and to support data quality.**" (underlined emphases added) "**If not written correctly, SOPs are of limited value. In addition, the best written SOPs will fail if they are not followed.**" "**The development and use of SOPs minimizes variation and promotes quality through consistent implementation of a process or procedure...**". "**Ultimately, the benefits of a valid SOP are reduced work effort, along with improved comparability, credibility, and legal defensibility.**"

The Brown Report states that the SOPs were revised for a variety of reasons, and lists the primary reasons. While it is acceptable practice in the environmental industry to revise a SOP, on occasion, to adjust for changed or unanticipated field conditions, or to incorporate the use of alternate or new field equipment, CDM modified its SOP used for litter and soil sampling during the IRW sampling program an excessive number of times, which indicates a poorly thought-out program from the onset. For example, CDM's SOP: 5-1 for "Litter and Soil Sampling", attached as an Appendix to the Brown Report and which was developed as a significant component of the IRW project, was revised ten times (including two versions of SOP: 5-1, Revision 1; one dated January 25, 2005 and the other dated May 11, 2005, and each with a different SOP title) between January 2005 and February 2007, as evidenced by the revision number on the SOP. Revising a SOP ten times over a 2-year period is inconsistent with the USEPA guidance document cited above in the Brown Report which states that a SOP "minimizes variation" of a procedure to promote quality. Further, and as detailed in the CRA Oversight Report, the frequently revised SOPs still were not consistently followed by CDM field personnel conducting the sampling activities.

As concluded in Section 6.0 of this CRA Second Report, CRA believes, as is supported by Mr. Brown's August 26, 2008 deposition transcript, that SOPs were revised from time to time to compensate for the fact that CDM sampling personnel were not properly following the stipulated SOP procedures. Mr. Brown's definitions of a SOP (Section 2.0, page 1-3 of Brown Report; pages 32, 36, and 37 of Mr. Brown's deposition transcript) are incorrect and are inconsistent with USEPA and industry standards. CRA notes that in Mr. Brown's deposition transcript (pages 32 and 37), Mr. Brown attempts to qualify his definition of SOP for the benefit of matching the IRW sampling program designed and implemented by CDM by using the phrases "as it applies in this case" and "in this program".

Further, and in addition to all of the above, as documented on page 142 of Mr. Brown's August 26, 2008 deposition transcript, CDM had concern that the various CDM sampling teams were not consistently documenting changes to field sampling protocols in their field books. Accordingly, CDM's after-the-fact documented field activities identified in its many revised SOPs cannot be relied upon as being accurate. CDM's failure to record important information during field sampling activities is acknowledged by Mr. Brown on page 174 of his August 26, 2008 deposition transcript where, with respect to recording important information on the actual locations of field runoff samples (i.e., whether samples were collected from a puddle, pool, or ditch; standing water or flowing), Mr. Brown confirms "That record did not seem to be consistently recorded in the field books."

Pages 1-4 to 1-5, "2.3 Decontamination Procedures"

The Brown Report states that "**Decontamination procedures are an important aspect of the SOPs associated with the collection of samples to be submitted for analytical parameters. Decontamination procedures were designed to reduce the number of variables which could impact data evaluation and interpretation.**" In contrast however, and as detailed in Section 4.0 of this CRA Second Report, the Olsen Report attempts to minimize the importance of decontamination and attempts to explain why decontamination of soil sampling equipment between sample locations is not necessary. These rationalizations/explanations in the Olsen Report are inconsistent with the above statements in the Brown Report.

The last two paragraphs of Section 2.3 of the Brown Report describe two procedures CDM identifies were used by CDM to decontaminate soil and litter sampling equipment. These described procedures, however, are:

- inconsistent with the decontamination procedures described on pages 1-14 of the Brown Report;
- inconsistent with the decontamination procedure described on page 1-15 of the Brown Report, which states that with respect to litter sampling equipment "**No decontamination of sampling tools occurred.**";
- inconsistent with the procedures described in SOP: 5-1;
- inconsistent with the procedures described in the CDM Work Plan;
- inconsistent with the decontamination procedures described in Section 2.1.7 on page 2-3 of the Olsen Report (discussed in Section 4.0 herein), which states that litter sampling equipment were used only once (thereafter donated to the grower or

thrown away), and there is no mention of decontamination prior to use to remove any manufacturing residues; and

- inconsistent with the decontamination procedures described in Section 2.2.4 on page 2-6 of the Olsen Report.

In fact, of the multiple descriptions of soil and litter sampling equipment decontamination procedures referenced above, there is not consistency between any of the descriptions. Specifically, neither the individual components of the decontamination procedures nor the sequence of equipment decontamination components are the same in any of the multiple equipment decontamination methods described. This shows CDM's lack of understanding of the importance of and care in implementing proper, consistent, decontamination procedures; the lack of care and attention to detail in preparation of SOPs and the CDM Work Plan to be used for the collection of samples; the lack of regard for USEPA guidance with respect to preparing and following SOPs; and the lack of regard for following industry standards. This general lack of care is typical of the field sampling activities conducted by CDM and observed by CRA, and impairs the defensibility of the integrity of samples collected by CDM and the representativeness of the analytical results generated therefrom.

Pages 1-7 to 1-8, "3.1 Training"

This section of the Brown Report describes various pre-field and in-the-field training and review sessions conducted by CDM staff involved in the sampling programs. While various training and field review components are identified, training on and review of SOPs by field staff is not mentioned. Based on Mr. Brown's August 26, 2008 deposition transcript (page 121), Mr. Brown could not confirm whether each team member had even been provided with a copy of the SOP for the sampling work they were going to conduct. Further, according to page 121 of Mr. Brown's deposition transcript, a tracking system was not in place to document what training sampling personnel had received. Additionally, according to page 124 of Mr. Brown's deposition transcript, no procedure was in place to re-train sampling team members when a SOP changed. A tracking system to document training and re-training received by CDM field staff would be important for the management of an investigation as extensive as the IRW investigation, where many different sampling personnel were involved, to ensure that qualified sampling personnel were used for sample collection in all instances, and that personnel were properly trained on the most current SOP.

The repeated violations of CDM SOPs in the field are evidence that the training provided to field staff was not effective. CRA believes it possible that this apparent lack of training of CDM staff on CDM's SOPs and/or revisions to SOPs as the SOPs were

verbally changed (see pages 123 or Darren Brown's August 26, 2008 deposition transcript) allowed for inconsistencies in the way field sampling activities were conducted by CDM, and repeated inconsistencies in the written SOPs to go un-noticed by CDM, as detailed in this CRA Second Report.

Page 1-12, "4.5 SOP 3-1 Spring Sampling"

In the last paragraph CDM concludes that SOP 3-1 for "Spring Sampling" appears to have been correctly implemented. However, the CDM conclusion is in contravention to CDM spring sampling procedures observed by CRA. In at least three locations in CDM's SOP the importance of not causing disturbance (of sediment) when collecting a spring water sample is identified. The **USEPA** guidance document entitled **"A Compendium of Superfund Field Operations Methods"** [6], also identifies the importance of collecting surface water samples that are free of sediment by stating that samples should be collected **"while the sampling personnel are standing down stream so as not to stir up any sediment to contaminate the sample."**

As documented in the CRA Oversight Report, and in video recording, CRA observed CDM stir up a significant amount of sediment in a spring being sampled by stepping in the spring prior to sample collection, and additionally by allowing a sampling pump to discharge directly upstream of the spring water sample location. These actions resulted in suspended sediments, which may have additionally been contaminated with cow manure being included in the spring water samples, thereby contaminating the samples. Accordingly, based on CRA's observations of CDM's field sampling activities, CDM cannot defend that the actions of its field personnel during spring water sampling allowed for collection of representative samples.

CRA notes that the SOP for Spring Sampling attached as an appendix to the Brown Report is SOP: 3-1 Revision 3, dated February 5, 2007. The Spring Sampling SOP that would be expected to be followed by CDM sampling personnel during spring sampling conducted during 2006 and under the oversight of CRA would have been SOP: 3-1 Revision 2, dated January 19, 2006. While Revision 3 and Revision 2 are similar, CRA notes that at least two of the components specified in the SOP were made less stringent in Revision 3 as compared to Revision 2. Specifically, Section 3.1.5 of Revision 3 of SOP: 3-1 now states that **"the sample location should preferably be no more than 200-feet downstream of the point where the water reaches the ground surface."** (underline emphasis added), as compared to Revision 2 which reads **"the sample location shall be no more than 200-feet downstream of the point where the water reaches the ground surface."** (underline emphasis added).

In addition to the above revision, the Quality Control (QC) section of Revision 3 of SOP: 3-1 also was made less stringent in Revision 3 as compared to Revision 2. Specifically, Revision 3 now reads that **"Control samples may include trip blank samples, duplicates, decontamination (rinsate) blanks or split samples. Duplicates collected as co-located or split samples should be collected at least once for every twenty samples."** (underline emphasis added), as compared to Revision 2 which reads **"Control samples will include field blanks, duplicates, and split samples."** (underline emphasis added).

CRA is not aware of the reason that CDM revised its Spring Sampling SOP to be less stringent, however terms such as "should preferably" and "may" in any SOP are ambiguous, have the potential to cause confusion amongst sampling personnel, and do not provide clear instruction as to exactly where to sample and as to what QC samples are actually required to be collected. Use of such ambiguous terms has the potential to result in inconsistent implementation of the Spring Sampling SOP, which could affect the reliability and representativeness of the analytical data generated from the sample analyses. CDM has not justified its decision to relax its QC procedures in 2007, after completion of the vast majority of its spring sampling activities during 2005 and 2006. Specifically, according to page 1-12 of the Brown Report, which presents a summary of when spring sampling activities were conducted, 55 springs were sampled during 2005 and 2006, as compared to only 2 springs sampled during 2007. SOP: 3-1 Revision 1, dated June 20, 2005 and SOP: 3-1 Revision 2, dated January 19, 2006, and which would have been applicable during 2005 and 2006, respectively, both state that Control samples will include field blanks, duplicates, and split samples. There is no documentation that justifies why CDM relaxed its specified QC requirements for 2007 (SOP: 3-1 Revision 3).

On page 137 of Mr. Brown's August 26, 2008 deposition transcript, Mr. Brown testified there was not a quality assurance, quality control project plan (typically referred to by USEPA and in the environmental industry as a "QAPP" for "quality assurance project plan") for the IRW investigation program designed and implemented by CDM, but that some quality control requirements were included in the SOPs. As identified above, the QC section of the SOP for spring sampling was revised to be less stringent and uses ambiguous terms that have the potential to cause confusion amongst sampling personnel regarding collection of QC samples. This is also the case for SOPs prepared by CDM for other IRW sampling activities such as litter and soil sampling, and groundwater/residential well sampling. In short, the QC sections of the CDM SOPs are ambiguous and incomplete, and do not satisfy the requirements of a QAPP that typically would be prepared in the environmental industry for such a sizeable sampling program as the IRW investigation. For example, USEPA policy requires that all work performed by or on behalf of USEPA involving the collection of environmental data be

implemented in accordance with a USEPA-approved QAPP. A QAPP is a planning document that provides a "blueprint" for obtaining the type and quantity of data needed to support environmental decision making. A QAPP integrates all technical and quality aspects of a project and specifies all quality assurance (QA), quality control (QC), and technical activities and procedures associated with planning, implementing, and assessing environmental data collection operations. USEPA has several guidance documents available for use in preparing a QAPP.

While it is outside of CRA's scope of work to provide specific comments on the nature and extent of CDM's QA/QC activities, because of the size, complexity, and legal nature of the IRW investigation CDM failed to meet industry standards by not preparing a complete and consolidated QAPP. Some examples of other Oklahoma agency programs where a QAPP is implemented for the performance of environmental programs are as follows:

- **Oklahoma Conservation Commission, Water Quality Division,** Illinois River Watershed Monitoring Program, National Monitoring Project - post-best management plan (BMP) implementation monitoring is conducted following a QAPP [20]
- **Oklahoma Department of Environmental Quality, Water Quality Division, Watershed Planning Section,** Total Maximum Daily Load (TMDL) program identifies that Federally funded programs that collect or manipulate data require a EPA-approved QAPP [21]
- **Oklahoma Department of Environmental Quality,** Title 252, Chapter 220 rules of Brownfields Voluntary Redevelopment Act requires that applicants submit a QAPP for site characterization activities [22]
- **Oklahoma Water Resources Board, Water Quality Programs Division,** Oklahoma Water Watch Volunteer Water Quality Monitoring Program has an established QAPP to be followed for the collection of environmental data on water quality conditions of Oklahoma's water resources [23, 24]
- **Oklahoma Water Resources Board,** Beneficial Use Monitoring Program (BUMP) – a QAPP is to be used for all monitoring programs conducted as part of the program [25]

Page 1-13, "4.7 SOP 5-1 Litter and Soil Sampling" and Footnote [1]

Based on Footnote 1 in the Brown Report, Mr. Brown, CDM's project manager for the "Oklahoma Poultry Project" on behalf of the State of Oklahoma seems unaware of the existence of the CDM Work Plan provided to Defendants by the State, and that was a key document relied on by CRA for reference during CRA's observations of IRW field sampling activities conducted by CDM. Specifically, by letter dated May 2, 2006 to Scott

McDaniel and Jay Jorgensen (representatives for Defendants), Louis Bullock (representative for Plaintiff) provided to Defendants a document referred to in Mr. Bullock's transmittal letter as **"the Work Plan for the soil and litter sampling"**. Attached to the transmittal letter is an undated and uncovered document prepared by CDM with the heading "Illinois River Watershed Soil and Litter/Manure Sampling Protocol", complete with Exhibits A through E. This is the document referred to in the CRA Oversight Report and during Jay Churchill's court testimony in February 2008 as "CDM Work Plan". During his August 26, 2008 deposition testimony, Mr. Brown himself uses the term "**work plan**" to describe documents prepared by CDM to identify sample collection methods (see deposition transcript, pages 48, 56, 174, 212 for example). On page 212 of Mr. Brown's deposition transcript, Mr. Brown specifically describes the existence of a "**work plan**" that was available to field staff for use prior to reformatting into SOPs. Regardless, however, a comparison between the CDM Work Plan and Revision 7 of SOP: 5-1 for Litter and Soil Sampling dated April 24, 2006, indicates that the documents are the same. Therefore, CRA's references and comments in the CRA Oversight Report are, in fact, correct as written, and accordingly, the Brown Report Footnote 2 comment regarding Section number references is misplaced.

As a point of further clarification, on page 216 of Mr. Brown's August 26, 2008 deposition transcript, Mr. Brown implies that in preparation of the CRA Oversight Report, CRA relied on "Version 6" of SOP: 5-1 Litter and Soil Sampling. Mr. Brown's implication is incorrect. As identified above, CRA relied on the CDM Work Plan, which appears to be the same as Revision 7 of SOP: 5-1 (which as confirmed on page 216 of Mr. Brown's deposition transcript was applicable to the 2006 sampling).

Page 1-13, "4.7 SOP 5-1 Litter and Soil Sampling"

CRA notes that the SOP for Litter and Soil Sampling attached as an appendix to the Brown Report is SOP: 5-1, Revision 9, dated February 6, 2007. As identified previously in this CRA Second Report, CDM revised SOP: 5-1 ten times over a 2-year period. Also, as identified above it appears to CRA that Revision 7 of SOP: 5-1, dated April 24, 2006 is the same document as the CDM Work Plan provided by Plaintiffs to Defendants on May 2, 2006. CRA assumes that CDM relied upon the CDM Work Plan for Litter and Soil Sampling during CDM soil sampling activities conducted during 2006, and SOP: 5-1 Revision 8, dated February 5, 2007 and SOP: 5-1 Revision 9, dated February 6, 2007 during CDM soil sampling activities conducted during 2007 and 2008. Revisions 8 and 9 are substantively the same as each other, except that Revision 9 includes information on how to layout a Sampling Area for soil sampling.

CRA has identified several significant differences between Revisions 8 and 9 that would have been used by CDM during 2007 and 2008 as compared to the CDM Work Plan used by CDM during 2006. All of the modifications incorporated into Revisions 8 and 9 of SOP: 5-1 Litter and Soil Sampling are less stringent than the CDM Work Plan, and the new procedures specified in Revisions 8 and 9 more closely match the field sampling activities actually conducted by CDM and observed by CRA during 2006; the following are examples of these less stringent requirements:

- Section 4.3, Item 6. on page 8 of Revision 9 now adds a provision that states **"Whenever a soil sample is to be collected, thatch and other plant residue shall be moved aside or lightly scuffed aside without removing the surface soil prior to pushing the soil probe core into the soil."** Presumably, this provision was added to allow for CDM's ineffective attempts to clear vegetation from the surface of the soil sample location using the soil sample probe, as CRA observed CDM doing during 2006 and 2007.
- During CDM's soil sampling activities conducted during 2006, the CDM Work Plan/SOP: 5-1, Revision 7, in effect at the time required decontamination of soil sampling equipment between Sampling Areas; however CDM field personnel did not conduct this required decontamination. Section 4.6 Decontamination Procedures was modified in SOP: 5-1, Revision 9 to remove the sentence in Item 6. on page 8 of the CDM Work Plan that CDM was following during 2006 that states **"After each collection of the 20 sub-samples, all equipment that will be reused will be decontaminated."** Section 9.1 of the same Revision 9, however, continues to state that **"All reusable sampling equipment shall be decontaminated…… between Sampling Areas."** Section 4.6 of Revision 9 also was revised to state that decontamination between **"subareas….will consist of removing soil material from the corer barrel and the knife or implement used to cut the soil samples"**, however, the methods and elements of the required decontamination procedure were not specified. Regardless, however, CRA did not observe CDM conducting such soil removal from the sample probe and knife between subareas/Sampling Areas.
- Section 5.5 Field QA/QC Samples (Manure/Litter) component of Revision 9 of SOP: 5-1 also was made less stringent as compared to the CDM Work Plan. Specifically, Revision 9 now states that control samples (field duplicates, blind standards, decontamination blanks) "may" be collected, rather than "will" or "shall" be collected as specified in the CDM Work Plan.
- A new sentence was added to Section 7.0 "Shipment of Samples to the soil/litter processing laboratory and to the analytical laboratory" on page 17 of Revision 9 of SOP: 5-1 to state that **"Depending upon circumstances, LAL samples may be held as much as 48 hours before shipment."** This requirement, again, is less stringent

than the statement on page 13 of the CDM Work Plan that states "**In no event, shall samples be held more that 24 hours before shipment.**"

CRA believes that some or all of the above modifications to make Revisions 8 and 9 of SOP: 5-1 Litter and Soil Sampling less stringent may have been made to compensate for the fact that CDM sampling personnel were not properly following the sampling and equipment decontamination procedures, and sample QA/QC requirements specified in the CDM Work Plan and Revision 7 of SOP: 5-1.

Page 1-14, "4.7 SOP 5-1 Litter and Soil Sampling"

Footnote 2 of the Brown Report states that SOP: 5-1 "was modified to clearly state that full decontamination procedures were only required when equipment and staff left a grower's property and/or passed on to a public right-of-way." This footnote also is inaccurate. Specifically, while Section 4.6 Decontamination Procedures of SOP: 5-1 states that "Full decontamination will occur between every LAL property, or upon exit of a grower's field onto a public right-of-way.", Section 9.1 of the same SOP clearly states that "All reusable sampling equipment shall be decontaminated.....between Sampling Areas.", where "Sampling Area" is defined in Section 4.1.2 of the SOP as being "an area within a LAL or CL" (where CL is a Control Location). Further, and as detailed previously in this CRA Second Report, the decontamination procedures identified in Section 9.1 are inconsistent with the decontamination procedures described in the CDM Work Plan, the Brown Report, and the Olsen Report.

The above repeated inconsistencies in the decontamination procedures identified by CDM show CDM's lack of regard for proper, consistent, decontamination procedures; the lack of care and attention to detail in preparation of SOPs and the CDM Work Plan to be used for the collection of samples; the lack of regard for following USEPA guidance with respect to preparing SOPs; and the lack of regard for following industry standards. This general lack of care is typical of the field activities conducted by CDM and observed by CRA, and impairs the defensibility of the integrity of samples collected by CDM and the representativeness of the analytical results generated therefrom.

Based on handwritten "Notes & Comments, July 3-7, 2006" prepared by Tom Pedersen of CDM on what appears to be the CDM Work Plan for soil and litter/manure sampling (handwritten notes are included as Exhibit 4 to the transcript of Darren Brown's August 26, 2008 deposition testimony), Mr. Pedersen also identified how field procedures being implemented were inconsistent with the CDM Work Plan, and identified concerns and inconsistencies within the CDM Work Plan itself. Specifically, Mr. Pedersen's notes comment that sampling equipment is not being decontaminated

between sampling areas (see page 8 of 17); that sampling equipment decontamination procedures differ from ODAFF training (see pages 8 of 17 and 16 of 17); and that the sampling equipment decontamination procedures are inconsistent within the CDM Work Plan itself (see page 16 of 17).

Given the ten revisions made to SOP: 5-1 Litter and Soil Sampling over only a 2-year period, it is noteworthy that such repeated inconsistencies apparently were not resolved by CDM during the performance of field sampling, nor during training sessions that CDM claims to have conducted with field staff, training supervisors, task leaders, and the project manager. As detailed above, based on Mr. Brown's deposition testimony, CDM had no procedure in place to re-train sampling team members when a SOP changed.

In the first two paragraphs on page 1-14, the Brown Report describes what it considers two levels of decontamination protocols. As previously identified in this CRA Second Report, the "full decontamination procedures" identified in the first paragraph on page 1-14 are not consistent with the procedures identified on page 1-5 nor other procedures referenced by CDM.

In the second paragraph the Brown Report describes decontamination procedures that CDM claims were conducted between soil sample subareas where sampling crews did not exit onto public right-of-ways, and states that "**The second level of decontamination consisted of removing soil material from the corer barrel and the knife or implement used to cut the soil samples prior to collection of the first soil sample from the next LAL subarea. In addition, the corer was driven into the soil at the first grid location of the following subarea and the material removed and discarded prior to commencing the grid sampling program. This was done to further reduce the possibility of cross-contamination between LAL subareas.**" (underline emphasis added). These statements in the Brown Report indicate that this "second level" of decontamination conducted between sample grids was comprised of both "removing soil material" from the sample probe and knife (though it's not specified how) and additionally driving the sample probe into the ground and removing the material. In fact, based on CRA's observations of CDM's sampling activities in the field CDM did not make any attempt to remove soil from the probe or knife between subareas as CDM claims, and driving the sample probe into the ground "at the first grid location of the following subarea" was not conducted with any regularity. CDM's claims are simply inaccurate.

The third full paragraph on page 1-14 of the Brown Report states "**Within a subarea, the SOP did not require decontamination ... between grid locations.**" Again, this

statement is inaccurate. In CDM's various documents, including the Brown Report, CDM Work Plan, and SOP: 5-1, CDM is inconsistent in the use of terms "grid", "subarea", "grid location", "Sampling Area", and "Sub-Sampling Location". In fact, these five different terms are used by CDM to describe the same thing, which is a square or rectangular 1- to 10-acre sampling area within a Litter Application Location (LAL). CDM's conflicting use of terms would be expected to cause confusion within CDM as to when and what type of equipment decontamination is to be conducted. Regardless, a "grid" is the same as a Sampling Area, and Section 9.1 of SOP: 5-1 clearly states that **"All reusable sampling equipment shall be decontaminated..... between Sampling Areas."** Due, in part, to multiple and conflicting terms used in its own documents, CDM personnel did not implement consistent procedures with respect to decontamination of sampling equipment.

In the two "bullet" items listed in Section 4.7 (pages 1-14 and 1-15), the Brown Report attempts to rationalize why CDM did not conduct proper decontamination of soil sampling equipment and why Mr. Brown believes cross-contamination between soil sample depths is not important, and minimizes the importance of following proper soil sample collection and sample equipment decontamination techniques. This is inconsistent with the intent of a sampling program seemingly designed by CDM to collect zoned samples, and CDM's earlier statement in Section 2.3 on page 1-4 that **"Decontamination procedures are an important aspect of the SOPs associated with the collection of samples to be submitted for analytical parameters."** While it has been clearly demonstrated in the CRA Oversight Report that CDM's soil sample collection procedures and sample equipment decontamination were not in accordance with protocols and procedures outlined in the CDM Work Plan, Fact Sheets, SOPs, USEPA guidance, and standards typical of the environmental industry, in the last two bullet items of Section 4.7, CDM attempts to justify its sample collection and lack of equipment decontamination procedures, effectively, as 'good enough'. 'Good enough' is not the standard of care required to be exercised in the environmental industry in order to obtain reliable, credible analytical data, and is inconsistent with USEPA and other industry guidance that repeatedly stress the importance of minimizing or eliminating the potential for cross-contamination of samples for the purpose of maximizing data reliability. As detailed in Section 4.0 of this CRA Second Report, it simply is not consistent with USEPA guidance or industry standards to conduct careless data collection practices then attempt to rationalize those practices as being satisfactory after-the-fact. CDM's failure to decontaminate the soil sample probe between sample core locations would have resulted in the potential for bacteria and nutrients present at one sample location and remaining on the probe (from cow manure on the ground surface, for example) to be pushed into the soil profile at another location, resulting in

cross-contamination between sample locations and sample depth intervals, and therefore CDM cannot defend that the analytical results are representative.

During his September 10, 2008 deposition testimony, Dr. Roger Olsen confirmed his agreement that USEPA is a credible agency in the areas of environmental sampling and analysis and that USEPA standards are in keeping with the rigors of the scientific method (page 151 of deposition transcript). Some examples of USEPA and other agency and industry guidance documents that stress the importance of proper sampling equipment decontamination methods, proper sample collection methods, and minimizing or eliminating the potential for cross-contamination are as follows:

- **USEPA Environmental Response Team, Standard Operating Procedures, Soil Sampling** [8] states "There are two primary potential problems associated with soil sampling – cross-contamination of samples and improper sample collection." "Improper sample collection can involve using contaminated equipment..... resulting in variable, non-representative results."
- **USEPA, Compendium of ERT Groundwater Sampling Procedures** [9] states that "Preventing or minimizing cross-contamination in sampled media and in samples is important for preventing the introduction of error into sampling results and for protecting the health and safety of site personnel.", and "Removing or neutralizing contaminants that have accumulated on sampling equipment ensures protection of personnel.... and minimizes the likelihood of sample cross-contamination."
- **USEPA, A Compendium of Superfund Field Operations Methods** [6] states "Effective decontamination procedures are implemented to minimize the potential for cross-contamination (the transfer of contaminants, usually from one sample to another, by improperly decontaminated sampling equipment, containers, or devices...)", and "The most effective procedure is contamination avoidance, that is, the use of procedures or materials to minimize or eliminate the potential for contact with contaminants."
- **USEPA, Environmental Investigations, Standard Operating Procedures and Quality Assurance Manual** [11] states "After field cleaning, equipment should be handled only by personnel wearing clean gloves to prevent re-contamination."
- **USEPA, Data Validation and Data Usability** [12], states "Sampling methodology and sample handling procedures can introduce errors by the inappropriate use of sample collection equipment, unclean sample containers, improper sampling equipment decontamination...." and "Contamination can be introduced during every aspect of sampling and analysis. Contamination can occur from using the same sampling instruments to collect samples (cross-contamination)..."

- **ASTM D 5088-90, Standard Practice for Decontamination of Field Equipment Used at Nonradioactive Waste Sites** [7] describes decontamination to "maximize the representativeness of physical or chemical analyses"; and states with respect to decontamination that "although such techniques may be difficult to perform in the field, they may be necessary to most accurately evaluate low concentrations of the chemical constituent(s) of interest." The ASTM standard also states that "An appropriately developed, executed, and documented equipment decontamination procedure is an integral and essential part of waste site investigations."
- **New Jersey Department of Environmental Protection (NJDEP), Field Sampling Procedures Manual** [10] states "An important aspect of quality control is the decontamination of field sampling equipment. Improperly cleaned and prepared sampling equipment can lead to misinterpretation of environmental data due to interference caused by cross-contamination." and "All soil sampling devices used for chemical analysis must be decontaminated prior to use and in between sample locations." The NJDEP document also states "It can not be overstated that costly and lengthy cleanup or permit decisions are based on the outcome of soil samples collected in relatively short order. Therefore, initial attention to equipment selection and its preparation can offer a significant reduction in oversight expense while providing the most professional results." and "Equipment should be handled as little as possible prior to use and disposable gloves must be worn at all times when handled."

As noted in the guidance documents cited above, the goal of implementing proper sample collection methods and equipment decontamination methods clearly is to minimize or eliminate, at every stage of the process, even the potential for cross-contamination of samples in order to obtain accurate, representative data. On page 130 of Mr. Brown's August 26, 2008 deposition transcript, Mr. Brown also states his opinion that cross-contamination of a sample "could provide a non-representative or non-typical result". None of the USEPA/agency and industry guidance documents refer to an "acceptable" potential level of cross-contamination or a 'good enough' approach as CDM would appear to indicate as satisfactory for the IRW sampling program. Further, on page 148 of Mr. Brown's August 26, 2008 deposition transcript Mr. Brown testified with respect to cross-contamination, by CDM's actions, between soil sample depth intervals that "**there could be carryover from one interval to the next but that did not have an impact on how we were using the data. So in the broad sense, there was no cross-contamination by how we were using the data.**" The only reasonable interpretation of Mr. Brown's statement is, specifically, yes, there was cross-contamination between samples.

Based on the handwritten "Notes & Comments, July 3-7, 2006" prepared by Tom Pedersen of CDM on what appears to be the CDM Work Plan for soil and litter/manure sampling (handwritten notes are included as Exhibit 4 to the transcript of Darren Brown's August 26, 2008 deposition testimony), Mr. Pedersen also questioned the fact that CDM were not decontaminating sampling equipment between fields and questioned whether "carryover of biologicals" was an issue for samples.

The NJDEP and USEPA guidance documents cited as References 10 and 11 above, respectively, also note that clean gloves should be worn when handling sampling equipment to prevent re-contamination. As detailed in the CRA Oversight Report, CDM typically did not change gloves during the collection of soil samples nor the handling of soil sampling equipment, which is a violation of agency and industry standards.

Page 1-15

In the last paragraph of Section 4.7 CDM concludes **"The SOP facilitated the collection of reliable data under repeatable collection procedures."** As detailed above, CRA believes that, at best, SOP: 5-1 is inconsistent and confusing, and does not allow for repeatable collection procedures and reliable data for the following reasons:

- Inconsistent and confusing use of terms, making it difficult for CDM sampling personnel to decipher when sampling equipment was to be decontaminated. For example, Section 4.2 of the SOP defines a Sub-Sampling Location as **"A Sub-Sampling Location is a one to ten acre area within a Sampling Area at which individual soil samples will be collected."** Section 4.3, on the next page of the SOP, however, defines a Sub-Sampling Location as **"a Sub-Sampling Location shall be an area defined by a triangle with three-foot sides with the middle placed on the Sub-Sampling Location."**; and
- Inconsistent descriptions of when decontamination of sampling equipment is to be conducted and what decontamination sequence is to be followed.

The above inconsistencies would allow for the SOP to be interpreted in different ways by different CDM sampling personnel, therefore field implementation of the SOP would not have been consistent or repeatable and CDM cannot defend that the resulting data are reliable.

Page 1-22, "4.19 SOP 11-1 Residential Well Sampling"

In the last paragraph CDM concludes that SOP: 11-1 for "Residential Well Sampling" appears to have been correctly implemented. However, the CDM conclusion is in

contravention to CDM residential well sampling procedures observed by CRA. As documented in the CRA Oversight Report, CRA observed CDM collect groundwater samples from wells without adequately purging the wells in order to obtain fresh water to sample. Additionally, CDM also collected groundwater well samples from contaminated access points, including garden hoses and an un-sterilized spigot. These activities could have resulted in the collection of unrepresentative groundwater samples, and therefore, CDM cannot conclude that the data are reliable.

In Exhibit 13 to the transcript of Darren Brown's August 26, 2008 deposition testimony CDM claims that wells were not adequately purged and samples were collected directly from garden hoses due to limitations imposed on CDM by growers / landowners, and additionally, CDM asserts that purging is not required for a well that is frequently operated. In the environmental industry, a sample typically would not be collected if the integrity/ representativeness of the sample was questionable. Regardless, in the event that a sample of questionable integrity/representativeness was collected it would need to be properly documented in the field records, and equally as importantly, the sample analytical results must be "flagged" such that the representativeness of the results can be properly considered by personnel reviewing and making decisions based on the data. As detailed in this CRA Second Report, the transcript of Mr. Brown's August 26, 2008 deposition testimony (see transcript page 142) indicates that CDM had concern that CDM personnel were not consistently documenting changes made to sampling procedures in their field log books. CRA cites the following examples, as specific evidence of CDM's failure to properly document important changes/violations of its residential well sampling procedures. Additionally, the following examples provide responses to CDM's claims that the landowners imposed restrictions on CDM's sampling or that the wells were frequently operated:

- On July 11, 2006 CDM collected water samples from the well at 2-Saun Farm. The samples were collected directly from a garden hose, a potential source of bacteria and other constituents. Based on CRA's review of CDM's field book for the well sampling, CDM did not even make note that the samples were collected from a garden hose. Also, there is no mention in CDM's field notes that the landowner would not allow access to the well water other than through the garden hose as CDM claims in Exhibit 13 to Mr. Brown's August 26, 2008 deposition testimony. Personnel reviewing and making decisions based on the data from the water samples would have no way of knowing that the water samples were compromised and that the potential unrepresentativeness of the results should be properly considered in decision making.

- On July 18, 2006 CDM collected water samples from a well at the Bill Schwabe Farm, without purging the well prior to sample collection. Failure to purge a well prior to collection of groundwater samples could result in groundwater samples that are not representative of fresh groundwater in the formation, but rather representative only of stagnant groundwater sitting in the well that may contain bacteria or other constituents. CDM identifies in Exhibit 13 to Mr. Brown's August 26, 2008 deposition testimony that the land owner would not permit purging of the well, and this is supported by a note recorded in CDM's field log book. CDM did not make any mention in its field book, however, as to whether there was any basis to assume that the well was used frequently, as CDM offers as justification as to why it was acceptable to sample an un-purged well, or when the well was last used. CDM also has not provided evidence that the analytical data from the groundwater samples were "flagged" for the data users as being compromised, potentially with bacteria or other constituents not associated with groundwater in the formation. Accordingly, personnel reviewing and making decisions based on the data would have no way of knowing that the samples were compromised and that the potential unrepresentativeness of the results should be carefully considered in decision making.
- On July 18, 2006 CDM collected water samples from a second location at the Bill Schwabe Farm. These samples were collected directly from a garden hose at the milking barn, and additionally, without purging the well prior to sample collection. As identified above, a garden hose and an un-purged well both are potential sources of bacteria and other constituents. While CDM claims in Exhibit 13 to Mr. Brown's August 26, 2008 deposition testimony that landowners would not allow access to the well water other than through the garden hose, there is no mention of this in CDM's field notes. CDM also did not make any mention in its field book, as to whether there was any basis to assume that the well was used frequently, as CDM offers as justification as to why it was acceptable to sample an un-purged well, or when the well was last used. Finally, CDM has not provided evidence that the analytical data from the groundwater samples were "flagged" for the data users as being compromised, potentially with bacteria or other constituents not associated with groundwater in the formation. Accordingly, personnel reviewing and making decisions based on the data would have no way of knowing that the samples were compromised and that the potential unrepresentativeness of the results should be carefully considered in decision making.

CRA notes that the SOP for Residential Well Sampling attached as an appendix to the Brown Report is SOP: 11-1 Revision 3, last revised February 6, 2007. Similar to the multiple versions of the SOP used by CDM for Litter and Soil Sampling, CDM also has

multiple version of SOPs for the collection of residential well samples. For example, CRA has reviewed the following CDM SOPs, all seemingly designed for the collection of groundwater samples from residential wells:

- **IRW Groundwater Sampling**, SOP: 1-1, Revision: 0, Date: January 9, 2006, Revised: January 2007. This same SOP is also hand-labeled **SOP 11-1**, Rev. 0, dated January 2, 2007.
- **Residential Well Sampling**, SOP: 1-1, Revision: 1, Date: January 9, 2006, Revised: January 2007. This same SOP is also hand-labeled **SOP 11-1**, Rev. 1, dated January 4, 2007.
- **IRW Groundwater Sampling**, SOP: 1-1, Revision: 2, Date: January 9, 2006, Revised: January 3, 2007. This same SOP is also hand-labeled **SOP 11-1**, Rev. 2, dated February 5, 2007.
- **Residential Well Sampling, SOP: 11-1**, Revision: 3, Date: January 2, 2007, Last Revised: February 6, 2007.

CDM again has used multiple SOPs with multiple names and multiple SOP numbers to conduct its groundwater sampling activities. With respect to development of a SOP for groundwater sampling, CDM again failed to conform to USEPA guidance and industry practice to develop a clear, understandable SOP, and identify what the SOP was intended to address.

CRA also notes, with respect to the most current version of SOP: 11-1, Revision 3 that is attached as an appendix to the Brown Report, that the Quality Control component of the SOP is now less stringent than the Quality Control components of the above noted previous versions of SOP 11-1 and SOP 1-1. Specifically, Section 4.0 of Revision 3 of SOP: 11-1 now reads that "**Control samples may include trip blanks or duplicates.**" (underline emphasis added), as compared to previous versions of SOP: 11-1 and SOP: 1-1 which state that Control samples "**will include field blanks, duplicates, and split samples.**" (underline emphasis added). CRA has not identified any justification for CDM revising its Residential Well Sampling SOP to be less stringent, however a term such as "may" in any SOP is ambiguous and has the potential to cause confusion amongst sampling personnel as to exactly what Quality Control samples are required to be collected. Use of such an ambiguous term also has the potential to result in inconsistent implementation of the SOP between various sampling personnel, which could affect the overall Quality Control and comparability of the analytical data generated. CRA also has not identified any justification as to why CDM would suddenly relax its Quality Control requirements in 2007, after completion of the groundwater sampling activities during 2006 and possibly earlier, unless CDM had not,

in fact, followed its SOPs applicable to groundwater sampling during 2006 and perhaps previously and CDM were trying to modify its SOP to match the field activities that were actually conducted. By relaxing such a requirement, sampling personnel could collect fewer Quality Control samples without violating the SOP. It is also noteworthy that in the Quality Control section of SOP: 11-1, Revision 3, CDM has added the sentence reading **"Decon blanks were not collected as the samples were collected directly from the tap or faucet and sampling equipment was not necessary."** Such a sentence, justifying why a certain procedure wasn't followed previously, would not normally be included in an SOP designed to provide a directive on the methods and procedures to complete a task.

Pages 1-23 to 1-24, "5.0 Overall Evaluation of Field Program"

CDM's general evaluation of the field sampling program concludes that:

- the SOPs developed and modified for the sampling program were "sufficient" to meet CDM's data quality objectives;
- the SOPs provide methods to produce repeatable sample collection and sample handling procedures;
- the SOPs were correctly implemented; and
- the resulting data are reliable and can be used for their intended purposes.

For the reasons detailed in Section 3.0 of this CRA Second Report and in the CRA Oversight Report, CRA's comments on CDM's general evaluation of the field sampling program are as follows:

- CDM's SOPs are poorly written, difficult to understand, and contain many inconsistencies and ambiguities in terminology, sample collection methods, and sampling equipment decontamination procedures, which lead to inconsistent implementation of equipment decontamination and sampling procedures by CDM field personnel, as evidenced by CDM's repeated violations of the SOPs;
- As a result of the inconsistencies and ambiguities within the SOPs, items left open for interpretation by CDM sampling personnel, and changes in field sampling protocols not consistently being documented in field books, the SOPs do not produce repeatable procedures;
- CDM field personnel appear to have not been properly trained and conducted repeated and material violations of SOPs, CDM Work Plan, USEPA guidances, and industry standards during implementation of the field sampling program;

- USEPA, agency, and industry standards are in place to ensure sample integrity and reliability of data. Both the design and implementation of CDM's IRW sampling program fail to meet standards of USEPA, agency, and industry that would be expected for such an extensive program; and
- As a result of all of the above, CDM cannot defend that the resulting analytical data are reliable and representative.

4.0 SIGNIFICANT COMMENTS ON OLSEN REPORT WITH RESPECT TO FIELD SAMPLING METHODS IMPLEMENTED BY CDM

The following comments are made on the Olsen Report primarily with respect to CRA's observations of CDM field sampling activities conducted during 2006 and 2007. However additional related comments, some of which are based on a review by CRA of transcripts of deposition testimonies by Darren Brown of CDM on August 26, 2008; Dr. Berton Fisher (expert witness of Plaintiffs) on September 3, 2008; and Dr. Roger Olsen of CDM on September 10 and 11, 2008, also are made where warranted.

Page 2-1, "2.1.4 Sampling Approach/Scheme"

The Olsen Report identifies that the poultry litter samples were collected in accordance with "SOP 5-1 (Soil and Litter Sampling) and SOP 5-2 (Litter and Soil Sample Compositing)". As identified in Section 3.0 above discussing the Brown Report, the CDM Work Plan, as provided to Defendants by the Plaintiff, is the document referred to in the CRA Oversight Report and during Jay Churchill's February 22, 2008 court testimony. As detailed in Section 3.0, a comparison between the CDM Work Plan and SOP: 5-1 for Litter and Soil Sampling indicates that the contents of the documents are substantively the same.

Page 2-3, "2.1.8 Alterations to the Sampling Program"

The Olsen Report states that the litter samples collected by CDM are representative of the poultry waste, except for litter samples collected from FAC06 because the inside of the poultry house was dark and some of the litter samples contained soil from below the bedding material. CRA's observations and records indicate that soil from the poultry house floor beneath the bedding material was included in the litter samples from at least two locations, FAC06 and FAC08. Further, although the OSU Factsheet for Sampling Animal Manure [14] specifically states **"Collect the entire depth of the litter, but be careful not to remove soil beneath the litter"**, this important point about collecting a representative litter sample is not included in CDM's SOP: 5-1 Litter and Soil Sampling. This suggests CDM personnel were not properly trained as to the nature of conditions that could affect litter sample collection from a poultry house. The importance of not cross-contaminating poultry litter samples with soil underlying the litter pack is exemplified by a statement made by Dr. Berton Fisher (another expert witness of Plaintiffs) during Dr. Fisher's September 3, 2008 deposition testimony (page 216 of deposition transcript) during which, with respect to cross-contamination of poultry litter samples from clay soil beneath the litter pack, Dr. Fisher stated "a very little bit of clay can go a long way".

In addition to the above, based on CRA's direct observation in the field, the CDM sampling individual only inquired (asked the Producer) as to the nature of the poultry house floor after completing the sampling and was not aware that he was including soil in the sample (i.e., after advancing the spade into the ground at 18 locations) until CRA, whom suspected CDM was including soil from beneath the litter pack in the sample repeatedly examined sample aliquot locations and actually carried material from the base of one location outside to visually confirm the presence of soil in the sample. CRA's oversight activities were limited by the same lighting as CDM, however CRA made the effort to examine the locations of the litter samples collected by CDM for the presence of soil, while CDM did not until CDM observed CRA doing so. This is another example of the lack of care exercised by CDM during field sampling activities observed by CRA.

Because the lighting in the poultry house was inadequate for proper litter sample collection CDM should have arranged for appropriate temporary lighting to be available to ensure that representative litter samples were collected. It is not typical in the industry to collect samples under conditions, for example inadequate light, where the integrity/representativeness of the samples cannot be confirmed. In the event that a sample of questionable integrity/representativeness is collected it would need to be properly documented in the field records, and equally as importantly, the sample analytical results must be "flagged" such that the representativeness of the results can be properly considered by personnel reviewing and making decisions based on the data. As detailed in this CRA Second Report, the transcript of Mr. Brown's August 26, 2008 deposition testimony (see transcript page 142) indicates that CDM had concern that CDM personnel were not consistently documenting changes made to sampling procedures in their field log books.

Pages 2-5 to 2-6, "2.2.4 Sampling Approach/Scheme"

SOP: 5-1 attached to the Brown Report does not have the associated Appendices A-3 and A-4 identified in the Olsen Report, nor any other appendices.

Similar to Section 4.7 of the Brown Report, the Olsen Report attempts to rationalize why proper decontamination of sampling equipment is not necessary, although USEPA guidance repeatedly states the importance of proper decontamination. The Olsen Report claims that decontamination between sample depths is "not necessary because the volume of potential cross-contamination is minimal relative to the overall sample volume".

The Olsen Report claims that the data would not "**change enough**" to affect the intended use of the data, and seems to take the position that striving for 'good enough' is sufficient for the purposes of the IRW sampling program conducted by CDM. 'Good enough' is not the standard of care required to be exercised in the environmental industry, and is inconsistent with USEPA and other industry guidance that repeatedly stress the importance of minimizing or eliminating even the potential for cross-contamination of samples for the purpose of maximizing data reliability. The goal of any environmental sampling program should be to obtain high quality, objective data, rather than data that is simply 'good enough' as CDM deems adequate for the IRW sampling program conducted by CDM.

In addition to the above, the **USEPA** document "**USEPA Environmental Response Team, Standard Operating Procedures, Soil Sampling**"[8] not only stresses the importance of sampling equipment decontamination but also says to "**remove and discard a thin layer of soil from the area which came in contact with the spade**". The intent of removal of this thin layer of soil is to, even after proper equipment decontamination (which the Olsen Report also claims is not necessary, as detailed in the above paragraph), further ensure that the soil sample does not pick up any contaminants off the surface of the sampling equipment. CDM did not make any attempt to remove the outer layer of soil from the soil sample material during its soil sample collection activities, and therefore any constituents or materials (i.e., manure, soil from other depth intervals, rust, and metals) that were on the inside of the soil sampling probe may have cross-contaminated the soil samples. Again, USEPA and other agency and industry guidance stresses the goal to minimize or eliminate, at every stage in the process, the potential for cross-contamination of samples, and CDM did not do this.

The Olsen Report states that SOP: 5-1 Litter and Soil Sampling indicates that decontamination of sampling materials should take place when moving between sampling grids on a grower's property, and that such decontamination "**was accomplished by scraping the soil off and then driving and removing a pilot core (at the new grid location) between sampling of each sample grid within a property.**" This so-called "decontamination" procedure is inconsistent with Section 9.1 of SOP: 5-1, which clearly states that "**All reusable sampling equipment shall be decontaminated**" using a sequence of washes/rinses using non-phosphate detergent, bleach, and de-ionized water "between Sampling Areas". Regardless, however, "scraping the soil off and then driving and removing a pilot core" would not be considered an acceptable level of decontamination by any recognized environmental standard, and furthermore, CRA did not observe CDM do this with any regularity. The Olsen Report is incorrect in implying that "scraping the soil off and then driving and removing a pilot core" was conducted "between sampling of each grid within a property."; it simply is not accurate.

Page 2-17, "Field and Laboratory Analyses"

The Olsen report states that field parameters of conductivity, temperature, and pH were collected at "most" of the sampled wells, and that the primary purpose of collecting these parameters was to assess the general water quality and usability of the wells. While some information on water quality can be obtained from such field parameters, the primary technical reason for collection of these parameters is to determine, during groundwater well purging, when fresh water representative of groundwater in the geologic formation is present in the well. It is this fresh water that should be sampled during the collection of groundwater samples. Failure to collect such field parameters prior to collection of a groundwater sample is inconsistent with USEPA guidance and industry standards, and could result in the collection of groundwater samples that are not representative of fresh groundwater in the formation, but rather representative only of stagnant groundwater sitting in the well that may contain bacteria or other constituents not representative of groundwater.

As detailed in the **USEPA** document **"Handbook for Sampling and Sample Preservation of Water and Wastewater"** [13], **"The importance of proper sampling of wells cannot be overemphasized." "To obtain a representative sample of the ground water it must be understood that the composition of the water within the well casing and in close proximity to the well is probably not representative of the overall groundwater quality at that sampling Site....For these reasons it is highly desirable that a well be pumped or bailed until the well has been thoroughly flushed of standing water and contains fresh water from the aquifer."** Accordingly, CDM cannot defend that the groundwater samples collected by CDM and for which field parameters were not measured prior to sample collection are representative of groundwater conditions.

Page 2-19, "2.6.7 Implementation of Sampling Approach"

The Olsen Report claims that sampling of springs in the IRW was conducted consistent with CDM's sampling protocols described in SOP: 3-1 (Spring Sampling).

As detailed in Section 3.0 above, and as documented in the CRA Oversight Report, CRA observed several significant deficiencies associated with CDM's spring sampling activities, including the stirring up of a significant amount of sediment in a spring being sampled by stepping in the spring prior to sample collection and additionally by allowing a sampling pump to discharge directly upstream of the spring water sample location. These actions resulted in suspended sediments, which may have additionally

been contaminated with cow manure being included in the spring water samples, thereby contaminating the samples. As detailed in Section 3.0, the **USEPA** guidance document entitled **"A Compendium of Superfund Field Operations Methods"** [6] states the importance of not disturbing sediments during the collection of water samples.

At one location cow manure was observed on the bank in close proximity (within several feet) to the area of depression where CDM collected the spring water sample. At another location, cattle had been observed in the vicinity of a spring/surface water sample location. Accordingly, CDM cannot defend that cross-contamination (nutrients, bacteria) from these surface influences did not affect the integrity of the surface/spring water samples and the associated data generated therefrom.

Page 3-2, "3.1 Data Quality Objectives"

The Olsen Report states that because the objectives and intended use of data from CDM's IRW sampling program **"are not for a decision making process but for a documentation and evaluation process, not all the detailed steps of"** USEPA's Data Quality Objective (DQO) **"process are appropriate."** CRA believes this statement is fundamentally flawed, and seems to minimize the importance of collecting data of high quality for the IRW project.

The Olsen Report goes on to say, however, that CDM's scopes of work, sampling plans, and SOPs contained the major items of USEPA's recommended DQO process, "that resulted in data of sufficient quality that could be used for all the intended purposes". This statement implies that CDM has applied the same 'good enough' approach to its DQO approach as it did to its approach to following its SOPs for sample collection and sampling equipment decontamination procedures, as detailed in Section 3.0.

Page 3-2, "3.2 Selection of Parameters for Analyses"

The Olsen Report states that **"Scope of works and SOPs were modified as needed based on field conditions and review of the resultant data."** Normally, Standard Operating Procedures would not be revised based on "resultant data", unless the data were determined to be flawed or otherwise unrepresentative. The statement in the Olsen Report indicating that SOPs were revised based on resultant data raises the question as to whether the results obtained from samples collected based on the revised SOPs are biased or otherwise unrepresentative. Further, depending upon the types of revisions made to the SOPs, data resulting from samples of the same medium but collected using different/modified methods may not be comparable. As identified above, the goal of any environmental sampling program should be to obtain high

quality, objective data, rather than data that is simply 'good enough' as CDM deems adequate for the IRW sampling program conducted by CDM.

Page 3-14, "3.7.3 Representativeness"

With respect to data quality, The Olsen Report defines "representativeness" as "**a qualitative parameter that is most concerned with the proper design of the sampling plan and the absence of cross contamination**", and identifies reasons why CDM believes good representativeness was achieved. Statements made by CDM in Section 3.12, page 3-21 of the Olsen Report, however, would indicate that the "**absence of cross contamination**" portion of CDM's definition of representativeness was not important to CDM. Specifically, in the second paragraph of Section 3.12 Cross Contamination Evaluation, on page 3-21 of the Olsen Report, it states "**For this data use, any cross contamination between the intervals would not matter because an average value of all three intervals is the result being used.**" and "**Any potential cross contamination (see calculations below) would not affect these intended evaluations and data uses.**"

Two of the reasons the Olsen Report identifies as reasons why data representativeness was achieved by CDM are "Proper gathering and handling of samples to avoid interference and prevent contamination and loss." and the use of "decontaminated sampling equipment". This reference to decontaminated sampling equipment is inconsistent with CDM's other statements regarding the decontamination, or lack of decontamination, of sampling equipment that minimize the importance of decontamination.

During 2006 and 2007 CRA observed field activities conducted by CDM that included the collection of numerous soil, groundwater, surface/spring water, and poultry litter samples. CRA's observations of CDM's field sampling activities are documented in the CRA Oversight Report. Based on CRA's observations CDM cannot defend that the representativeness of the samples collected was not compromised due to, in part, improper sample collection procedures and improper sampling equipment decontamination procedures. Accordingly, CDM also cannot defend that the resultant analytical data are representative. A few examples of where the representativeness of the samples is indefensible as a result of improper sample collection methods and/or failure to properly decontaminate equipment, include:

Soil Samples

- Intermixing soil from different sample depth intervals during soil sample collection, as a result of dragging soil material through the end of the soil sampling probe and into a sample bag;
- Tipping the soil sample probe to empty remaining soil from all sample depth intervals into a sample bag;
- Failure to consistently and sufficiently decontaminate field equipment between sampling grids, and after visible contamination from soil and cow manure; and
- Advancing the soil sampling probe near and directly through cow manure during the collection of soil samples. Advancing sampling equipment through such an obvious source of cross-contamination, and failure to decontaminate sampling equipment between sample locations clearly is not in accordance with USEPA and agency guidances and industry practice.

Groundwater Samples

- Failure to adequately purge groundwater wells in order to obtain fresh water to sample; and
- Collection of samples from contaminated access points, including a garden hose and an un-sterilized spigot.

Spring Water Samples

- Sampling springs or surface water located in close proximity to cow manure, an obvious source of cross-contamination due to surface influences;
- CRA observed CDM sample four of what CDM identified to be springs. At least one of the sample locations was, in fact, downgradient of where the spring water emerged from an area of rocks, and the sample would more appropriately be described as "surface water". This surface water would have been exposed to air and other surface flow influences. This surface water is a source of drinking water for pastured cattle, and cattle were observed in the vicinity of the sample location immediately prior to sample collection. Additionally, cow manure was observed on the ground near the water sample location. Therefore, there was significant potential that the sample location would have been impacted by cow manure and other surface influences;
- Sampling personnel stepping in the spring prior to sample collection, stirring up and cross-contaminating the spring water samples with suspended sediments which may have additionally been contaminated with cow manure or other constituents; and

- Pump used to collect a spring sample discharging upgradient of spring and therefore stirring up sediments.

Litter Samples

- Litter composite samples not properly mixed;
- Soil from beneath the poultry house included in litter samples; and
- Failure to decontaminate litter sampling equipment prior to use (leaving manufacturers label on sample spade and in contact with litter to be sampled).

CDM has attempted to justify its sample collection procedures, effectively, as 'good enough'. 'Good enough' is not the standard of care typically required to be exercised in the environmental industry, and is inconsistent with USEPA and other industry guidance that repeatedly stress the importance of minimizing or eliminating the potential for cross-contamination of samples for the purpose of maximizing data reliability. It simply is not consistent with USEPA guidance or industry standards to conduct careless data collection practices then attempt to rationalize those practices as being 'good enough' after-the-fact. As a result of improper sampling equipment decontamination procedures, CDM cannot defend that the resultant analytical data are representative.

Also as noted in Section 3.0 above, inconsistencies in the decontamination procedures identified in SOP: 5-1 by CDM show CDM's lack of understanding of the importance of implementing proper, consistent, decontamination procedures. Accordingly, the Olsen Report cannot reasonably conclude that its data are representative due to use of properly decontaminated sampling equipment.

Based on the above examples of improper sample collection methods and insufficient sampling equipment decontamination, and numerous additional examples cited in the CRA Oversight Report, CDM cannot defend that the data resulting from the samples are representative.

Pages 3-15 to 3-16, "3.7.5 Comparability"

The Olsen Report states that "Consistency in the acquisition, handling, and analysis of samples is necessary for comparing results.", and that "Analytical results obtained from this investigation were achieved using standardized sample collection methods and analytical procedures."

Based on CRA's observations CDM cannot defend that there were no inconsistencies in the sample collection procedures used by CDM when sampling the same environmental medium. As a result of sample collection inconsistencies, CDM also cannot defend that the resultant analytical data are comparable. A few of the examples cited in the CRA Oversight Report that demonstrate the inconsistencies in the sample collection procedures observed by CRA include:

Soil Samples

- Advancement of the soil sampling probe through cow manure at some of the soil sample locations;
- Use of multiple soil sampling probes with different diameters during sampling activities; and
- Failure to consistently and sufficiently decontaminate field equipment at the start of daily sampling, between sample locations, between sampling grids, and after visible contamination from soil and cow manure.

Groundwater Samples

- Failure to adequately purge some groundwater wells prior to sampling;
- Collection of some samples from potentially contaminated access points; and
- Collection of geochemical indicator measurements (e.g., temperature, pH, and conductivity) after sample collection, from at least one groundwater well location.

Spring Water Samples

- Sampling personnel stepping in the spring prior to sample collection, stirring up and cross-contaminating the samples with suspended sediments which may have additionally been contaminated with cow manure; and
- Collection of samples at several surface water/spring locations where there was evidence of cattle near the sample locations.

Litter Samples

- Litter composite samples not properly mixed;
- Soil from beneath the poultry house included in the litter sample at two locations at least; and
- Inconsistent collection of litter sub-samples due to trimming of collected material.

In addition to all of the above, as detailed in Section 3.0, SOP: 5-1 Litter and Soil Sampling was revised ten times over a 2-year period. Depending upon the type of revisions made to the SOP, data resulting from soil and litter samples collected using different/modified methods may not be comparable.

Page 3-21 to 3-23, "3.12 Cross Contamination Evaluation"

While claiming in Section 3.7.3, on page 3-14, that good representativeness of data was achieved due to proper gathering of samples to "prevent contamination", in Section 3.12 the Olsen Report goes to great lengths to calculate the extent of potential cross-contamination of soil samples. The only reasonable interpretation of the statements and calculations in the Olsen Report is, yes, there was cross-contamination between the soil samples collected by CDM.

The CRA Oversight Report documents the cross-contamination of the soil samples between sample depths due to reasons including, but not limited to, failure to properly decontaminate sampling equipment prior to soil sampling probe advancement; failure to decontaminate the sampling knife between sample locations and depths; tipping the sampling probe to empty remaining residual soil into the sample bag; and using the sample knife to drag soil material from shallower depth intervals through residual soil remaining in the probe from deeper depth intervals thereby cross-contaminating the soil samples collected from each of the sample depth intervals.

The Olsen Report calculations attempt to demonstrate a minimal impact of CDM's careless field sampling activities. The Olsen Report surmises that as a result of CDM's improper decontamination of field sampling equipment the maximum amount of soil left on the soil sampling probe would be approximately 2 grams and the maximum amount of soil on a dirty knife would be 0.5 gram. While commenting on the Olsen Report discussion of natural sample variability and analytical variability is beyond the scope of this CRA Second Report, Dr. Olsen's surmised amounts of cross-contamination resulting from CDM's improper sample collection methods and insufficient sampling equipment decontamination are significantly underestimated, and accordingly, the calculated impacts also are underestimated. For example, calculations provided in the Olsen Report assume that soil on the core probe in one particular LAL was observed two times, which is an unrealistically low assumption by a probable factor of 10. Table 1 of the CRA Oversight Report identifies only the documented (i.e., written in field notes; noted from video or photographs) observations and are representative of the minimum number of occurrences of a particular deficiency listed in the Table. Some of the deficiencies listed occurred essentially every time, or nearly every time, a sample was collected by CDM and accordingly, were not necessarily documented each and every

time as these deficiencies were the "norm". Such is the case with the documented number of times when soil was observed on a soil sampling probe or soil on the sample knife.

The Olsen Report calculations completely ignore some of the most significant contributors of cross-contamination between soil sample depth intervals, specifically, tipping of the soil sampling probe to empty remaining residual soil into the sample bag, and using the sample knife to drag soil material from shallower depth intervals through residual soil remaining in the probe from deeper depth intervals, which occurred during the collection of virtually every 0- to 2-inch depth sample. Therefore, there is no justification for Dr. Olsen's calculations, and therefore Dr. Olsen's calculated estimate of potential cross-contamination between soil samples is underestimated.

Pages 3-24 to 3-25, "3.12 Cross-Contamination Evaluation"

The Olsen Report presents calculations intended to again rationalize that collection of soil samples cross-contaminated with cow manure (due to advancing the soil sampling probe through cow manure) does not affect the use of the data. The Olsen Report assumes that eight composite soil samples could have been affected by the presence of cow manure. The basis for Dr. Olsen's assertion that only eight composite samples could be affected is not known to CRA. Assuming that CDM followed its SOP: 5-2 Litter and Soil Sample Compositing, in fact, 36 composite samples would have been affected in total (12 Sampling Areas where the sample probe was advanced through cow manure at least once, multiplied by three sample depth interval composite samples per Sample Area). The 12 Sampling Areas compromised by advancing the soil sampling probe through cow manure represent 16 percent of the Sampling Areas where CDM soil sampling was observed by CRA, and 53 percent of the Litter Application Locations (LALs) observed by CRA. Such a high percentage of compromised sample locations is not anywhere even near reflective of representing USEPA and industry standard goals of minimizing or eliminating even the potential for cross-contamination and striving for maximum data usability.

Page 3-25, "3.13 Summary and Conclusions"

The Olsen Report states that, with respect to Laboratory Analysis, "Quality assurance (QA) requirements were implemented to maximize delivery of high quality data." As identified in the **USEPA** document entitled **"Data Validation and Data Usability"** [12], however, **"Analytical procedures, although often targeted as the main source of error in data analysis, generally represent a minimal contribution of total error. Analytical error is quantified much more readily than error introduced during field activities..."**

As identified in the **USEPA** document entitled **"Handbook for Sampling and Sample Preservation of Water and Wastewater"** [13] **"Standardized analytical methods and quality control procedures become academic if samples are not representative of their original environment or if constituents change between time of sampling and analysis."** The document also states **"The four basic factors which affect the quality of environmental data are sample collection, sample preservation, analysis, and recording. *Improper actions in any one area* may result in poor data from which poor judgments are certain."** and **"Analytical methods have been standardized but the results of analyses are only as good as the sampling and the sample preservation methods."**

Therefore, while proper laboratory QA and analyses are certainly an important component of any sampling and analyses program, as identified in the above USEPA guidance documents, ensuring that samples to be analyzed are collected properly and are representative of actual conditions in the field has a greater affect on the overall representativeness of the analytical data. Based on CRA's observations of CDM's sample collection activities in the field, as detailed in the CRA Oversight Report, and as discussed in this CRA Second Report, CDM cannot defend that the samples of soil, groundwater, surface/spring water, and poultry litter collected by CDM are not cross-contaminated or otherwise representative of the targeted sample media.

5.0 COMMENTS ON CDM SAMPLING ACTIVITIES NOT OBSERVED BY CRA

As identified in Section 1.0, CRA observed certain field sampling activities conducted by CDM personnel on contract growers' farms pursuant to subpoenas and notice in 2006 and 2007, including a portion of CDM's soil, groundwater, surface/spring water, and poultry litter sample collection activities. CRA did not observe all field sampling activities conducted by CDM during 2006 and 2007, including but not limited to edge of field surface water runoff sampling, small tributary sampling, sediment sampling, and Lake Tenkiller sampling, nor any CDM sampling activities conducted prior to 2006 or following 2007.

During Mr. Churchill's court testimony on February 22, 2008, Mr. Churchill was asked if, based on CRA's observations of CDM sampling activities while CRA was observing, any conclusions could be drawn about how CDM field samplers performed when no one was watching. Mr. Churchill's response to the question was that he does not have any reason to believe CDM's sampling activities were better than when CRA was present to observe.

Subsequent to Mr. Churchill's court testimony, Mr. Churchill reviewed photographs provided to Defendants by the Plaintiffs showing CDM field sampling activities, and sampling locations, taken when CRA was not present to observe CDM's activities. **The following comments are provided based on a review of these photographs, taken when CRA was not present.**

Photograph Bates No. STOK0054023, CDM soil sample collection, April 1, 2008

- Based on the label on the sample bag, CDM is collecting a soil sample from the 2- to 4-inch depth interval; this observation also would be supported by the location of the sample knife being used to collect the soil sample;
- Note how residual soil from the underlying 4- to 6-inch interval in the sampling probe is dragged into the sample bag placed over the end of the probe, thereby compromising the integrity of the 2- to 4-inch sample;
- From the photograph, it can be seen that CDM sampling personnel are wearing cotton gloves, rather than nitrile or other disposable synthetic sampling gloves, which is inconsistent with USEPA and industry standards when collecting environmental samples; and
- Residual soil from advancing the sampling probe at this sample location, or another sample location, can be observed on the outside of the probe. This residual soil could be transferred into the sample bag, thereby cross-contaminating and compromising the integrity of the sample(s).

Photograph Bates No. STOK0054024, CDM soil sample collection, April 1, 2008

- Based on the label on the sample bag, CDM is collecting a soil sample from the 0- to 2-inch depth interval; this observation also would be supported by the amount of soil remaining in the probe. This is the same soil sample location (but different depth) shown in photograph Bates No. STOK0054023 described above;
- Note the residual soil from the underlying sample depth intervals clearly present on the inside of the sampling probe, thereby cross-contaminating and compromising the integrity of the 0- to 2-inch sample as the soil is dragged through the end of the probe into the sample bag;
- Note the significant amount of soil, potentially from the underlying depth intervals, clearly present on the sample knife, thereby compromising the integrity of the 0- to 2-inch sample; and
- Note that CDM sampling personnel are wearing cotton gloves, rather than nitrile or other disposable synthetic sampling gloves, which is inconsistent with USEPA and industry standards when collecting environmental samples.

Photograph Bates No. STOK0054070, CDM soil sample collection, April 1, 2008

- Based on the label on the sample bag, CDM is collecting a soil sample from the 2- to 4-inch depth interval;
- It can be seen how residual soil from the underlying 4- to 6-inch layer in the sampling probe is dragged into the sample bag placed over the end of the probe, thereby cross-contaminating and compromising the integrity of the 2-inch to 4-inch sample;
- Note the significant amount of residual soil from the 4- to 6-inch sample depth clearly present on the inside wall of the sampling probe, thereby cross-contaminating and compromising the integrity of the 2- to 4-inch sample as the soil is dragged through the end of the probe into the sample bag;
- Note the significant amount of residual soil on the outside of the sampling probe; on the sample knife; and on the sampler's gloves, which all could compromise the integrity of the soil samples; and
- Residual soil from advancing the probe at this core location, or other core locations, can be observed on the outside of the probe. Note that some of this soil from the outside of the probe appears to have fallen into the sample bag (note the presence of soil on the inside lip of the sample bag), thereby cross-contaminating and compromising the integrity of the sample(s).

Photograph Bates No. STOK0054186, CDM compositing of manure samples, April 18, 2008

- Page 2-61, "2.14.7 Implementation of Sampling Approach" of the Olsen Report states that, with respect to sampling of manure, **"Sampling conducted in 2008 was somewhat different than the work described in SOP 5-3." "All 2008 sampling equipment was decontaminated between cattle pastures..."**. SOP: 5-3 Manure Sampling for DNA Analyses, included in the Brown Report, however, states that **"Sampling equipment will be one time use. No equipment decontamination is anticipated."** This is evidence, again that CDM field sampling personnel did not properly follow its SOPS. Regardless, the photograph shows that the manufacturer's sticker was not even removed from the shovel used to composite beef cattle manure samples, indicating that proper decontamination of the shovel was not conducted. Failure to properly decontaminate sampling equipment between samples is inconsistent with USEPA and industry guidances and standards.

Photograph Bates No. STOK0054187, CDM "Decontamination" of sampling tools, April 18, 2008

- Photograph shows that during "decontamination" the manufacturer's sticker was not even removed from the shovel used to composite beef cattle manure samples, indicating that proper decontamination of the shovel was not conducted. Failure to properly decontaminate sampling equipment between samples is inconsistent with USEPA and industry guidances and standards.

CRA's comments above, are made based on CRA's review of photographs taken by CDM and/or State of Oklahoma representatives during CDM sampling activities conducted when CRA was not present to observe and are the same types of the comments made by CRA based on CRA's direct observations of CDM's sampling activities as documented in the CRA Oversight Report. Specifically, cross-contamination between soil sample depths; cross-contamination from soil remaining on the sampling probe and the sample knife; improper sampling equipment decontamination; and cross-contamination of samples from nutrients and bacteria from cattle manure also occurred during CDM sampling activities when CRA was not present to observe. From this, it is reasonable to conclude that during CDM sampling activities not observed by CRA, CDM exercised the same general lack of care as documented during sampling activities that were observed by CRA.

6.0 CRA CONCLUSIONS

The following conclusions are made based on CRA's observations of CDM's field activities during the 2006/2007 IRW sampling activities; review of protocols and procedures identified in the CDM Work Plan, CDM SOPs, OSU Factsheets, and other references used by CDM; review of USEPA, agency, and industry guidance documents; review of the Brown Report and Olsen Report; and review of deposition testimonies by Darren Brown of CDM on August 26, 2008; Dr. Berton Fisher (expert witness of Plaintiffs) on September 3, 2008; and Dr. Roger Olsen of CDM on September 10 and 11, 2008:

1. CRA's statements and conclusions presented in the CRA Oversight Report dated February 2008, and repeated as follows, remain valid:
   - During the collection of samples of soil, groundwater, surface/spring water, and poultry litter by CDM, CRA routinely observed CDM field personnel deviating from CDM's written sampling protocols and procedures, or otherwise collecting samples using technically unsound procedures, which resulted in unrepresentative sample analytical results.
   - CDM field personnel actions during soil sampling allowed for cross-contamination between soil sample locations, sample grids, and composite sample depths.
   - CDM field personnel actions during groundwater and surface/spring water sampling allowed for collection of unrepresentative and contaminated samples.
   - CDM field personnel actions during litter sampling allowed for collection of unrepresentative samples.
2. CDM's Work Plan and SOPs are poorly written, difficult to understand, were frequently revised, and contain many inconsistencies and ambiguities in terminology, sample collection methods, and sampling equipment decontamination procedures, which lead to inconsistent implementation of equipment decontamination and sampling procedures by CDM field personnel, as evidenced by CDM's repeated violations of the CDM Work Plan and SOPs.
3. As a result of the inconsistencies and ambiguities within the documents and items left open for interpretation by CDM sampling personnel, the SOPs do not produce repeatable procedures.
4. CDM field personnel repeatedly and materially violated SOPs, the CDM Work Plan, USEPA guidances, and industry standards during implementation of the field sampling program.

5. Based on CRA's documented observations of CDM's improper sample collection methods and insufficient sampling equipment decontamination, as detailed in the CRA Oversight Report and as discussed in this CRA Second Report, it is clear that CDM's contention that the soil, groundwater, surface/spring water, and poultry litter data are reliable is unsupported.

6. Based on CRA's review of the revisions made to CDM's SOPs for spring water sampling, litter and soil sampling, and groundwater sampling following commencement of CRA's oversight of CDM sampling activities in 2006, the SOPs were revised to be less stringent than previous versions of the SOPs. CRA has not identified any justification as to why CDM would suddenly relax its SOPs, and in particular, the Quality Control requirements, unless CDM sampling personnel were not properly following the procedures specified in the earlier versions of the SOPs and the CDM Work Plan, and CDM was modifying its SOPs, after-the-fact, to match the sampling activities that were actually being conducted in the field. By relaxing the Quality Control requirements sampling personnel could collect fewer Quality Control samples without violating the revised SOPs.

7. Training of CDM sampling personnel on sampling procedures does not appear to be adequate. By Mr. Brown's admission during deposition testimony, it could not be confirmed whether each sampling team member had even been provided with a copy of the SOP for the sampling work they were going to conduct. Further, SOPs were revised frequently, and according to Mr. Brown's deposition testimony, no procedure was in place to re-train sampling team members when a SOP changed.

8. The cross-contamination evaluation presented by CDM in the Olsen Report completely ignores some of the most significant contributors of cross-contamination between soil sample depth intervals. Therefore, there is no justification for Dr. Olsen's calculations, and accordingly, Dr. Olsen's calculated estimate of potential cross-contamination between soil samples is underestimated. The potential for cross-contamination between soil sample depth intervals is not consistent with USEPA and industry standard goals of minimizing or eliminating even the potential for cross-contamination.

9. Based on CRA's review of photographs taken by CDM and/or State of Oklahoma representatives during CDM sampling activities conducted when CRA was not present to observe, it is reasonable to conclude that during CDM sampling activities not observed by CRA, CDM exercised the same general lack of care as documented during sampling activities that were observed by CRA.

10. The IRW sampling program planned and conducted by CDM was not properly documented by CDM. A sampling program as extensive as the IRW investigation normally would include a carefully prepared Quality Assurance Project Plan (QAPP), however CDM did not prepare or follow a QAPP to support the reliability of the data generated from this program. CDM also did not have good, clearly written SOPs for sample collection. Therefore, while data quality is normally ensured by use of a QAPP and properly developed SOPs, CDM had none of these for the IRW sampling program. Additionally, CDM did not maintain documentation of training of personnel on the SOPs to ensure that personnel were properly trained on the most current SOP, and CDM did not consistently document changes to field sampling procedures in their field log books. As a result of the improper documentation, personnel reviewing and making decisions based on the data generated from the IRW sampling program conducted by CDM have no assurance of the quality of the data collection procedures and quality of the data.

7.0 REFERENCES

1. Soil and Litter/Manure Sampling Protocol, un-dated, prepared by Camp Dresser & McKee Inc., 17 pages of text plus Exhibits A through E.
2. Report of Sampling Oversight Observations, Illinois River Watershed, Oklahoma and Arkansas, dated February 6, 2008, prepared by Jay A. Churchill, Conestoga-Rovers & Associates.
3. Report Concerning the Sampling Program for the Oklahoma Poultry Litigation, dated May 15, 2008, prepared by Darren L. Brown, Camp Dresser & McKee Inc.
4. Olsen Expert Report, dated May 14, 2008, prepared by Roger L. Olsen, Camp Dresser & McKee Inc.
5. Guidance for Preparing Standard Operating Procedures (SOPs), EPA QA/G-6, EPA/600/B-07/001, April 2007, prepared by USEPA, pages 1 and 2.
6. A Compendium of Superfund Field Operations Methods, EPA/540/P-87/001, December 1987, prepared by USEPA, pages 10-32, 3-19, and 3-20;
7. ASTM D 5088 – 90, Standard Practice for Decontamination of Field Equipment Used at Nonradioactive Waste Sites, American Society for Testing and Materials, pages 1 and 2.
8. USEPA Environmental Response Team, Standard Operating Procedures, Soil Sampling, February 18, 2000, prepared by USEPA, pages 2 and 5.
9. Compendium of ERT Groundwater Sampling Procedures, EPA/540/P-91/007, January 1999, prepared by USEPA; Sampling Equipment Decontamination: SOP #2006, page 1.
10. New Jersey Department of Environmental Protection, Field Sampling Procedures Manual, August 2005, Chapter 2A pages 8 and 9, Chapter 6B page 15.
11. Environmental Investigations, Standard Operating Procedures and Quality Assurance Manual, November 2001, prepared by USEPA, page B-3.
12. Data Validation and Data Usability, August 1992, prepared by USEPA, pages 1 and 3.
13. Handbook for Sampling and Sample Preservation of Water and Wastewater, EPA-600/4-82-029, prepared by USEPA, pages 234, iii, v, and l.
14. Sampling Animal Manure, F-2248; Oklahoma Cooperative Extension Service; H. Zhang, D. Hamilton, J. Britton; page 1.

15. Photographs taken by Camp Dresser & McKee and/or State of Oklahoma representatives.

16. Multiple versions of Camp Dresser & McKee Inc. SOPs for Spring Sampling (SOP: 3-1); Litter and Soil Sampling (SOP: 5-1); IRW Groundwater Sampling and Residential Well Sampling (SOP: 1-1 and SOP: 11-1).

17. Transcript of the videotaped deposition of Darren Brown on August 26, 2008, and appendices.

18. Transcript of Volume I of the videotaped deposition of Berton Fisher, PhD., on September 3, 2008.

19. Transcript of Volumes I and II of the videotaped deposition of Roger Olsen, PhD., on September 10, 2008, and September 11, 2008, respectively, and appendices.

20. Illinois River Watershed Monitoring Program - National Monitoring Project, FY 2000 319(h): Task 700, Post-Implementation Monitoring Summary Report – Year 1, Preliminary Evaluation of Post-Implementation Monitoring, September 1, 2006, prepared by Oklahoma Conservation Commission, Water Quality Division, page 9.

21. Oklahoma Total Maximum Daily Load (TMDL) Practitioners Guide, prepared by Oklahoma Department of Environmental Quality, Water Quality Division, Watershed Planning Section, pages 12 and 13.

22. Oklahoma Department of Environmental Quality, Title 252, Chapter 220. Brownfields, Section 252:220-5-1. page 2, Site Characterization.

23. Quality Assurance Project Plan, Oklahoma Water Watch Volunteer Water Quality Monitoring Program, March 2006, prepared by Oklahoma Water Resources Board, Water Quality Programs Division.

24. Quality Assurance Project Plan, Oklahoma Water Watch Volunteer Water Quality Monitoring Program, March 2008, prepared by Oklahoma Water Resources Board, Water Quality Programs Division.

25. Status of Water Quality Monitoring in Oklahoma, Final Report to the Oklahoma Legislature For Year 2000, prepared by Oklahoma Water Resources Board, page 10.

Compensation

Jay Churchill's billing rate for preparation of this report is $140 per hour.

All of Which is Respectively Submitted,
CONESTOGA-ROVERS & ASSOCIATES

Jay A. Churchill, P. Eng.

Date: November 25, 2008

APPENDIX A

CRA OVERSIGHT REPORT, FEBRUARY 2008

REPORT OF SAMPLING OVERSIGHT OBSERVATIONS

ILLINOIS RIVER WATERSHED
OKLAHOMA AND ARKANSAS

Prepared For:
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FEBRUARY 2008
REF. NO. 046366

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1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) was retained in June 2006 by Tyson Foods et al. to review documents associated with the Illinois River Watershed (IRW) Sampling Activities, including:

- Camp Dresser and McKee (CDM) Work Plan entitled "Soil and Litter/Manure Sampling Protocol" (CDM Work Plan);
- OSU Cooperative Extension Fact Sheets (Factsheets);
- CDM Standard Operating Procedure entitled "Residential Well Sampling" dated January 9, 2006, revised January 2007 and February 6, 2007;
- CDM Standard Operating Procedure entitled "IRW Groundwater Sampling" dated January 9, 2006, revised January 3, 2007;
- CDM Standard Operating Procedure entitled "Spring Water Sampling" dated June 20, 2005 revised February 5, 2007;
- USEPA Standard Operating Procedures (EPA SOP); and
- Oklahoma Water Resources Board (OWRB) Water Quality Monitoring Program – Field Sampling Protocol for Water Quality Assessments of Streams and Rivers. Draft revised April 27, 2004.

In addition, CRA personnel provided oversight of the field sampling activities conducted by CDM personnel. CDM was assisted by sampling personnel from a firm named Lithochimeia. The business relationship between CDM and Lithochimeia is not known to CRA. Additionally, the employment of the various sampling personnel is not known to CRA. Accordingly, hereafter, in this Report on Sampling Oversight Observations, general reference is made collectively to "CDM" personnel collecting samples.

CRA field observations were compiled in field books, video recordings, photographs, and located using Global Positioning System (GPS) coordinates. A summary of the sampling issues observed by CRA during oversight of CDM's collection of soil, groundwater, surface/spring water and litter samples pursuant to subpoenas and notice in 2006 and 2007 is listed in Table 1. The issues identified in Table 1 occurred on a routine basis and are the most significant and material violations of published standard operating procedures and protocols observed. In addition to the issues listed in Table 1, CRA personnel noted deviations from the above mentioned documents, which are detailed in this report.

Jay Churchill, P. Eng. of CRA has a degree in engineering, and over 20 years of professional experience in engineering, project management, design, and construction oversight of environmental projects throughout North America and in Puerto Rico. Mr. Churchill has collected numerous soil, sediment, surface water, groundwater, concrete core, wipe, sludge, and air samples in accordance with regulatory agency-approved work plans at numerous sites. Mr. Churchill additionally has technical expertise in the agricultural field related to conservation planning, agricultural waste management systems, land treatment practices, nutrient management, and soil and water quality. In recent years, Mr. Churchill has provided project management and technical expertise to CRA's Agricultural Services Group and has been instrumental in the preparation of detailed reports, Comprehensive Nutrient Management Plans, work plans for agri-environmental projects, completion of environmental assessments for agricultural operations, and design review. Mr. Churchill's curriculum vitae is presented in Appendix A.

2.0 ACTIVITIES

2.1 BACKGROUND

The principals of environmental sampling are based on published Standard Operating Procedures and Protocols. The reason the EPA has promulgated procedures and protocols is to provide consistent methods for sample collection, thereby ensuring sample integrity and reliable analytical results. For the purposes of the 2006/2007 IRW sampling activities OSU factsheets, the CDM Work Plan and CDM Standard Operating Procedures (CDM SOPs) provided procedures and protocols for CDM field personnel to follow during sampling activities, including:

- Scope, Overview, and Application of SOPs for Soil, Water, and Litter Sampling;
- Sampling Methods Summary;
- Sampling Procedures for Soil, Water and Litter;
- Sample Containers, Preservation Techniques, Quality Assurance/Quality Control (QA/QC);
- Documentation of Sample Collection and Handling; and
- Reporting of Analytical Data, QA/QC, and Corresponding Field Details.

CRA field personnel observed repeated and material violations of the aforementioned protocols during oversight of the CDM sampling activities. In many instances CRA field personnel observed activities that resulted in direct cross-contamination of samples, presented the potential for unrepresentative analytical results, and showed disregard for established protocols. The manner in which samples were collected would indicate that CDM field personnel lacked the necessary training and experience to conduct the IRW sampling activities. This was evident in the underlying actions and poor adherence to the CDM SOPs.

2.2 OBSERVATIONS OF SOIL SAMPLING ACTIVITIES

During the 2006/2007 IRW sampling activities CRA field personnel observed CDM soil sampling activities on 19 Litter Application Locations (LALs). These LALs are pastures and fields that CDM believe received poultry litter application in the past. The purpose of the sampling is to characterize environmental conditions occurring as a result poultry litter application. The unrepresentativeness of the soil samples with respect to poultry constituents is a concern with many of the LALs selected for soil sampling, due to the presence of cow manure in the fields.

In addition to the repeated and material issues identified in Table 1, CRA field personnel routinely observed cases where CDM actions were either inconsistent with written protocols or otherwise compromised the integrity of the samples. Observations during soil sampling activities included repeated and material actions which violated SOPs and would have resulted in cross-contamination between discrete sample depths, sample grids, and LALs. The following expand on material issues identified in Table 1:

- Sampling in fields where cow manure was present and sampling in close proximity to cow manure. This is a violation of the OSU Factsheet F-2207 which indicates "do not sample immediately after lime, fertilizer or manure applications because those samples do not reflect true soil fertility";
- Advancing the sample probe directly through cow manure during soil sampling, which would have resulted in cow manure and associated nutrients being introduced directly into the soil samples. This is supported by the fact that significant amounts of organic matter were observed in a number of the soil samples. This is a violation of Section III. A. 6. of the CDM Work Plan. This would result in cross-contamination of each subsequent sample until the probe was properly decontaminated;
- Dropping sample equipment in cow manure, resulting in contamination of gloves and sampling equipment prior to collecting soil samples. This is a violation of Section III. A. 6. of the CDM Work Plan. This would result in cow manure and associated nutrients being introduced into the soil samples;
- Cow manure visible on sample probe prior to sample collection. This is a violation of Section III. A. 6. of the CDM Work Plan. This would result in cow manure and associated nutrients being introduced into the soil samples;
- Failure to consistently and sufficiently decontaminate field equipment at the start of daily sampling, between grids, or after visible contamination from soil and cow manure. This is a violation of Section III. A. 6. of the CDM Work Plan. This would result in cross-contamination of contaminants from residual soils and cow manure between sample locations, sample grids, and composite sample depths;
- The sampling knife was not cleaned between sample locations and depths, and residual soil was routinely visible on the knife prior to sample collection. This is a violation of Section III. A. 6. of the CDM Work Plan. This would result in residual amounts of soil material from one sample interval being introduced to soil sample material for another depth interval;
- Stepping in fresh cow manure then on the corner of the sample triangle prior to advancing soil sampling probe. This is a violation of Section III. A. 6. of the CDM

Work Plan. This would result in cow manure and associated nutrients being introduced to the soil sample location and subsequent soil samples;

- Clearing vegetation and organic matter from sample location with nitrile gloved hands introducing surficial soil, vegetation, and organic matter to the gloves and to subsequent soil samples handled with nitrile gloves. This is a violation of Section III. A. 6 and Section III. A. 4. d. of the CDM Work Plan.
- Not changing soiled nitrile gloves between sub-samples after coming into contact with cow manure and shallower soil intervals. This is a violation of Section III. A. 6. of the CDM Work Plan. This would result in cross-contamination of the deeper soil samples with nutrients and bacteria from the shallower soil samples;
- Soiled nitrile gloves were not changed between individual sample grids or fields. This is a violation of Section III. A. 6. of the CDM Work Plan. This would result in cross-contamination between soil samples and sample grids;
- Touching soil samples directly with soiled nitrile and cotton gloves and non-gloved fingers. This is a violation of Section III. A. 6. of the CDM Work Plan. This would result in cross-contamination of the soil sample with material that is present on the gloves;
- CDM personnel placing bare fingers and soiled nitrile gloves inside sample bag. This includes placing sample bag labels on the inside of the sample bags prior to arriving at the site to commence sampling activities. This is a violation of Section III. A. 6. of the CDM Work Plan. This would result in the cross-contamination of the soil sample with material that is present on the gloves or bare fingers;
- Discarding residuals of soil samples directly on top of the location of the subsequent samples which is a violation of Sections III. A. 4. b. of the CDM Work Plan. This would result in mixing of soil from different sample depths;
- Tipping the sample probe to empty all remaining soil into sample bag. This is a violation of Sections III. A. 4. b. of the CDM Work Plan. This would result in mixing of soil from different sample depths;
- The soil probe tip was used to clear vegetation and organic matter the from the sample location prior to driving the sample probe but did not appear to be effective. In other instances vegetation and organic matter were not cleared from the sample location prior to driving the sample probe. At no time was a shovel used to clear vegetation and organic matter which is a violation of Section III. A. 4. d. and Section 3 of Exhibit E of the CDM Work Plan. This would result in the inclusion of vegetation and organic matter in the sample;

- Consistently, not all soil material in the sample probe was removed from the probe when collecting the sample from a 2-inch depth interval using the knife. As sample material from shallower depth intervals was dragged into plastic sample bags from the tip of the sample probe, soil material remaining in the sample probe from the deeper depth intervals also was dragged into the sample bags for the shallower samples, which is a violation of Section III. A. 4. b. of the CDM Work Plan. This would result in mixing of soil from different sample depths;
- Advancing the sample probe deeper than 6 inches and using the same sample knife to remove soils deeper than 6 inches in depth, which is a violation of Section III. A. 4. b. of the CDM Work Plan. This would result in mixing of soil from different sample depths;
- Recovering less than 6 inches of soil in the sample probe but still dividing the sample into three "2-inch" sample depth intervals, which is a violation of Section III. A. 4. b. of the CDM Work Plan. This would result in mixing of soil from different sample depths; and
- Insertion of sample probe tip into sample bag and holding sample bag against sample probe tip during filling of sample bag. Touching of sampling equipment to sample containers would result in sample contamination from nutrients and/or bacteria from different soil depths than the soil depth being collected.

When comparing the above noted actions of CDM field personnel with the aforementioned procedures and protocols, significant concerns arise. By violating generally accepted standards, CDMs actions significantly compromised sample integrity which undermines the representativeness of the analytical results obtained from the soil samples.

2.3 OBSERVATIONS OF GROUNDWATER AND SURFACE/SPRING WATER SAMPLING ACTIVITIES

During the 2006 IRW sampling activities conducted by CDM, CRA field personnel observed the collection of six groundwater samples and four surface/spring water samples pursuant to subpoena and notice. There were no groundwater or surface/spring water sampling activities observed by CRA during 2007. During 2006 sampling activities, CRA field personnel observed cases where CDM actions were either inconsistent with written protocols or were otherwise technically unsound, and which may have resulted in the collection of compromised or unrepresentative samples. The following expand on material issues identified in Table 1:

- Failure to adequately purge groundwater wells, which is a violation of Section 2.0 of the Residential Well Sampling and IRW Groundwater Sampling SOPs which states "Wells should be allowed to fun for fifteen minutes before parameters are recorded and samples collected." This would result in the collection of unrepresentative groundwater samples;
- Collection of groundwater samples directly from a garden hose, a potential source of bacteria and other contaminants, which is a violation of Section 4.1 of the Residential Well Sampling and IRW Groundwater Sampling SOPs. This would result in the collection of unrepresentative groundwater samples;
- Collection of groundwater directly from an un-sterilized spigot, a potential source of bacteria and other contaminants, which is a violation of Section 4.1 of the Residential Well Sampling and IRW Groundwater Sampling SOPs. This would result in the collection of unrepresentative groundwater samples;
- Collection of groundwater and surface/spring water samples in un-sterilized sample containers, a potential source of bacteria and other contaminants, which is a violation of Section 4.1 of the Residential Well Sampling, IRW Groundwater Sampling and Spring Sampling SOPs. This would result in the collection of unrepresentative groundwater samples;
- Collection of geochemical indicator measurements (e.g., temperature, pH, and conductivity) after sample collection, which is a violation of Section 3.0 of the Residential Well Sampling and Spring Sampling SOPs. This would result in fresh groundwater not being sampled;
- Collection of groundwater and spring/surface water samples in unpreserved sample containers and/or without field filtering, which is a violation of Section 4.0 of the Spring Sampling SOP. This would result in the collection of unrepresentative groundwater samples;
- Stirring up sediment by stepping in spring/pond prior to water sample collection and after walking down cow path with visible cow manure on it. This action resulted in suspended sediments, which may have additionally been contaminated with cow manure, being included in the surface/spring water samples, thereby contaminating the samples;
- Stirring up sediment prior to sample collection by allowing peristaltic pump to discharge directly upstream of surface/spring water sample location and in the vicinity of cow manure. This action resulted in the suspended sediments, which may have additionally been contaminated with cow manure, being included in the surface/spring water sample, thereby contaminating the sample;

- Sampling surface/spring water where cattle had been observed standing, and with visual evidence of cow manure prior, to the spring sampling. This would have resulted in collection of unrepresentative and possibly contaminated samples;
- Sampling of spring/pond with significant algae growth and visible cow manure in and around water source, would result in the collection of unrepresentative and possibly contaminated samples; and
- Not decontaminating Yellow Springs Incorporated (YSI) meter (used for collection of geochemical indicator measurements) before placing it in the spring/pond prior to obtain a spring/surface water sample collection. This could result in cross-contamination of water samples.

These technically unsound sampling procedures conducted by CDM undermine the representativeness of the analytical results obtained from both the groundwater and surface/spring water samples.

2.4 OBSERVATIONS OF LITTER SAMPLING ACTIVITIES

During the 2006/2007 IRW sampling activities conducted by CDM, CRA field personnel observed the collection of 17 litter samples pursuant to subpoena and notice. During sampling activities, CRA observed cases where CDM's actions were inconsistent with written protocols. The following expand on material issues identified in Table 1:

- Composite sample not mixed thoroughly, which is a violation of Section 8 of Exhibit E from the CDM Work Plan and OSU Factcheet F-2248 which reads, "Place subsamples in a plastic bucket, and mix thoroughly". This would result in unrepresentative and non-homogenous CDM or split samples;
- CDM personnel placing sampling equipment and fingers inside sample containers. Touching of sampling equipment inside sample containers would result in cross-contamination of samples from nutrients and/or bacteria present on the sampling equipment;
- Sub-samples collected in tracks of the catchers' cage handling machines, resulting in cross-contamination of samples from nutrients and/or bacteria outside the poultry house;
- Inconsistent number of sub-samples collected from each poultry house;
- Inclusion of litter that was dropped on the litter bed, and then picked back up in the composite sample could result in compromised samples;

- Use of a pointed spade for sub-sample collection resulted in a proportionately higher amount of litter material from the upper portion of the litter pack being included in the composite sample, which is a violation of OSU Factsheet F-2248, which states, "Collect the entire depth of the litter.." and Section IV. C. 3. of the CDM Work Plan which states, "All samples from litter areas shall be collected through the full thickness (surface to base) of the litter/manure";
- Inconsistent trimming of litter material on shovel, using a trowel, resulted in inconsistent litter volumes being collected from each sample aliquot in the poultry house. In addition, the trimming also resulted in a proportionately higher amount of litter material from the upper portion of the litter pack being included in the composite sample, as varying amounts of loose material from the lower portion of litter pack would fall from the shovel during the act of trimming;
- Soil (i.e., not litter) from beneath the poultry house included in composite sample violates OSU Factsheet F-2248, which states "....but be careful not to remove soil beneath the litter"; and
- Mixing of litter sample and filling sample jar with hands, which violates Section 1.1 of Exhibit D that states, "Mixing will be accomplished using a disposable, plastic sampling scoop or a decontaminated stainless steel spoon".

During the collection of a number of litter samples, CDM field personnel violated the,, aforementioned procedures and protocols, resulting in unrepresentative or compromised sample results.

2.5 ADDITIONAL OBSERVATIONS

Additional observations made by CRA field personnel during the 2006/2007 IRW sampling activities included repeated and material actions of CDM field personnel which were inconsistent with written protocols, including but not limited to the following:

- Use of multiple soil sample probes with different diameters during sampling activities, which is a violation of Section III. A. 4. c. of the CDM Work Plan. This would result in biased analytical results due to unbalanced portions of soil material being included in the composite samples;
- Decontamination blanks on every LAL were not collected, which is a violation of Section III. A. 5. c. iii of the CDM Work Plan. Accordingly, there is no evidence that CDM's equipment decontamination procedures were sufficient;

- Visible rust present on soil sample probe sampler was not removed prior to the first sampling grid each day. This would result in the introduction of metals into the soil samples and unrepresentative sample results;
- Soil sample collection without use of the sample triangle, which is a violation of Section III. A. 4. of the CDM Work Plan. This would result in biased soil sample locations;
- Soil sample locations in visible ground depressions, under tree canopy, and along heavy use areas, which would result in unrepresentative sample results;
- Dragging of sample probe along ground surface between sub-sample locations and grids, which would result in cross-contamination of the soil samples; and
- Failure to remove manufacturer sticker from shovel used to collect litter samples.

The above actions occurred on a routine basis over the course of CDM's field activities, thereby adding to the significance of concerns with the deviations from the CDM Work Plan.

3.0 CONCLUSIONS

The following conclusions are made based on CRA's observations of CDM's field activities during the 2006/2007 IRW sampling activities and a review of protocols and procedures outlined in the CDM Work Plan, Factsheets, and SOPs:

1. During the collection of samples of soil, groundwater, surface/spring water, and poultry litter by CDM, CRA routinely observed CDM field personnel deviating from CDM's written sampling protocols and procedures, or otherwise collecting samples using technically unsound procedures, which resulted in unrepresentative sample analytical results.
2. CDM field personnel actions during soil sampling allowed for cross-contamination between soil sample locations, sample grids, and composite sample depths.
3. CDM field personnel actions during groundwater and surface/spring water sampling allowed for collection of unrepresentative and contaminated samples.
4. CDM field personnel actions during litter sampling allowed for collection of unrepresentative samples.

All of Which is Respectively Submitted,

CONESTOGA-ROVERS & ASSOCIATES

Jay A. Churchill, P. Eng.

Date: February 6, 2008

TABLE 1

LIST OF FIELD ISSUES OBSERVED 2006 - 2007
ILLINOIS RIVER WATERSHED
SOIL SAMPLING

Farm Name	Soil Sample	Cow Manure Observed in Field	Sample Probe in Bag	Improper Decontamination Soil On Sample Probe	Soil Visible on Gloves	Knife Dirty Prior to Sample Collection	Cow Manure in Proximity of Sample Location	Sampler Driven Through Cow Manure	CDM Staff Stepped on Triangle Corner	Sampling Knife Used to Scrape Soil Collected From Deeper Than 6 Inches	Nitrile/Non-Nitrile Gloved Fingers in Sample Bag	Vegetation in 0-2 Inch Sample	Vegetation Scraped From Ground Before Sampling Using Sampler Tip	Vegetation Not Scraped Prior to Sampling	Vegetation Pulled From 0-2 Inch Sample	Vegetation Included in 2-4 Inch Sample	Vegetation Included in Sample (Depth Not Noted)
Bill Anderson Section 30	LAL 5-A	x	20	0	0	0	5	0	0	8	12	0	0	20	1	1	13
Julie Anderson-Chancellor Farm	LAL 5-B	x	20	0	3	1	12	3	0	8	3	2	20	0	8	0	3
Julie Anderson-Chancellor Farm	LAL 5-C	x	18	3	2	0	3	0	1	5	10	0	16	0	1	0	4
Julie Anderson-Chancellor Farm	LAL 5-D	x	19	1	1	3	10	0	0	0	2	1	18	1	11	0	2
Anderson Hen Farm # 41	LAL 6-A	x	20	0	1	2	1	0	0	14	2	2	20	0	4	0	0
Anderson Hen Farm # 41	LAL 6-B	x	18	0	1	5	4	0	0	14	0	0	6	0	3	0	0
Anderson Hen Farm # 41	LAL 6-C	x	19	1	2	1	1	0	0	11	3	0	14	10	6	0	1
Anderson Hen Farm # 41	LAL 6-D	x	20	0	4	10	1	0	0	19	4	6	2	10	7	1	5
Pigeon Family Farm	LAL 7-A	x	16	2	11	1	8	0	14	7	4	0	3	4	20	0	0
Pigeon Family Farm	LAL 7-B	x	16	2	8	1	13	0	11	9	1	1	0	6	20	0	2
Pigeon Family Farm	LAL 7-C	x	18	3	3	1	4	0	0	14	13	0	0	2	20	3	0
Pigeon Family Farm	LAL 7-D	x	16	0	6	2	2	0	0	11	10	0	0	0	20	0	0
Ren Butler Farm	LAL 8-A	x	20	0	0	0	6	0	4	20	10	0	16	20	0	1	5
Ren Butler Farm	LAL 8-B	x	20	1	0	0	4	0	4	17	6	0	20	0	0	0	0
Ren Butler Farm	LAL 8-C	0	20	0	7	0	0	0	13	19	0	0	20	1	2	0	0
Ren Butler Farm	LAL 8-D	x	20	1	11	0	5	0	7	19	0	3	20	0	9	0	2
Reed Farm	LAL 9-A	x	20	2	4	2	15	0	2	19	3	1	4	13	12	0	1
Reed Farm	LAL 9-B	x	19	3	4	1	19	0	2	17	1	2	5	12	8	0	1
Reed Farm	LAL 9-C	x	19	0	3	0	0	0	7	19	5	0	0	13	3	0	0
Reed Farm	LAL 9-D	x	20	0	0	0	0	0	0	15	4	4	20	1	6	0	0
Green Country Farms	LAL 10-A	0	20	8	1	0	0	0	0	20	9	0	19	0	0	0	0
Green Country Farms	LAL 10-B	0	20	4	0	0	0	0	1	20	4	0	18	7	0	0	1
David Wofford Farm	LAL 11-A	x	12	0	1	0	1	0	0	9	4	2	0	13	0	0	6
David Wofford Farm	LAL 11-B	x	20	0	1	0	4	0	0	16	14	3	0	20	5	0	9
David Wofford Farm	LAL 11-C	x	18	0	0	0	6	1	1	14	8	3	0	20	0	0	3
David Wofford Farm	LAL 11-D	0	9	0	0	0	0	0	0	4	2	8	0	20	1	1	6

Sampling Information Produced by Conestoga-Rovers Associates

TABLE 1

LIST OF FIELD ISSUES OBSERVED 2006 - 2007
ILLINOIS RIVER WATERSHED
SOIL SAMPLING

Farm Name	Soil Sample	Cow Manure Observed in Field	Sample Probe in Bag	Improper Decontamination Soil On Sample Probe	Soil Visible on Gloves	Knife Dirty Prior to Sample Collection	Cow Manure in Proximity of Sample Location	Sampler Driven Through Cow Manure	CDM Staff Stepped on Triangle Corner	Sampling Knife Used to Scrape Soil Collected From Deeper Than 6 Inches	Nitrile/Non-Nitrile Gloved Fingers in Sample Bag	Vegetation in 0-2 Inch Sample	Vegetation Scraped From Ground Before Sampling Using Sampler Tip	Vegetation Not Scraped Prior to Sampling	Vegetation Pulled From 0-2 Inch Sample	Vegetation Included in 2-4 Inch Sample	Vegetation Included in Sample (Depth Not Noted)
McGarrah Farms	LAL 12-A	x	20	0	0	0	1	0	0	0	1	3	0	5	0	0	4
McGarrah Farms	LAL 12-B	x	20	0	0	0	0	0	0	0	0	7	0	0	4	0	1
McGarrah Farms	LAL 12-C	0	20	0	0	0	0	0	0	0	0	5	2	4	3	0	1
McGarrah Farms	LAL 12-D	x	8	0	0	0	4	1	0	0	0	6	3	0	7	0	0
Collins Farm	LAL 13-A	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Collins Farm	LAL 13-B	0	1	0	1	0	7	3	0	0	0	2	0	0	1	0	0
Collins Farm	LAL 13-C	x	18	0	2	1	6	0	0	9	2	2	0	0	1	0	6
Collins Farm	LAL 13-D	x	16	1	1	0	0	0	0	1	0	2	0	0	0	0	2
Glen Farm	LAL 14-A	0	3	1	0	0	4	1	0	0	0	1	9	5	20	0	0
Glen Farm	LAL 14-B	0	4	0	0	0	0	0	0	0	0	0	6	6	16	0	0
Glen Farm	LAL 14-C	0	5	0	0	0	0	0	0	0	0	5	3	3	10	1	0
Glen Farm	LAL 14-D	0	4	1	0	0	0	0	0	0	0	5	1	0	6	0	0
2-Saun Farm	LAL 15-A	x	6	0	0	1	11	4	0	0	0	0	0	0	0	0	0
2-Saun Farm	LAL 15-B	x	20	3	0	0	7	2	0	0	0	1	0	0	2	0	0
2-Saun Farm	LAL 15-C	x	8	0	0	0	3	1	0	0	0	1	0	0	2	0	0
2-Saun Farm	LAL 15-D	x	7	0	0	0	0	0	0	0	0	2	0	0	0	0	2
Bill Schwabe Farm	LAL 16-A	0	5	0	0	0	0	0	0	0	0	4	0	0	5	0	4
Bill Schwabe Farm	LAL 16-B	0	4	1	0	0	0	0	0	0	0	16	0	6	4	0	8
Bill Schwabe Farm	LAL 16-C	0	6	0	0	0	0	2	0	0	0	7	0	1	8	0	5
Bill Schwabe Farm	LAL 16-D	0	9	0	0	0	1	0	0	0	0	9	0	1	2	0	5
Woffard Farm (rented)	LAL 17-A	x	16	0	0	0	3	1	0	0	0	5	0	0	3	0	0
Woffard Farm (rented)	LAL 17-B	x	18	4	0	0	3	0	0	0	0	0	0	0	4	0	0
Woffard Farm (rented)	LAL 17-C	x	19	3	1	0	2	0	1	0	0	0	0	0	1	0	1
Woffard Farm (rented)	LAL 17-D	x	20	0	1	0	0	0	0	0	0	0	0	0	4	0	1
Billy Ray Anderson Farm	LAL 18-A	0	20	0	0	0	0	0	10	12	14	11	14	9	7	1	5
Billy Ray Anderson Farm	LAL 18-B	0	20	1	0	0	0	0	17	12	3	14	15	1	2	0	3

Sampling Information Produced by Conestoga-Rovers Associates

TABLE 1

LIST OF FIELD ISSUES OBSERVED 2006 - 2007
ILLINOIS RIVER WATERSHED
SOIL SAMPLING

Farm Name	*Soil Sample*	*Cow Manure Observed in Field*	*Sample Probe in Bag*	*Improper Decontamination Soil On Sample Probe*	*Soil Visible on Gloves*	*Knife Dirty Prior to Sample Collection*	*Cow Manure in Proximity of Sample Location*	*Sampler Driven Through Cow Manure*	*CDM Staff Stepped on Triangle Corner*	*Sampling Knife Used to Scrape Soil Collected From Deeper Than 6 Inches*	*Nitrile/Non-Nitrile Gloved Fingers in Sample Bag*	*Vegetation in 0-2 Inch Sample*	*Vegetation Scraped From Ground Before Sampling Using Sampler Tip*	*Vegetation Not Scraped Prior to Sampling*	*Vegetation Pulled From 0-2 Inch Sample*	*Vegetation Included in 2-4 Inch Sample*	*Vegetation Included in Sample (Depth Not Noted)*
Billy Ray Anderson Farm	LAL 18-C	0	20	0	0	0	0	0	17	12	5	9	7	10	6	0	1
Billy Ray Anderson Farm	LAL 18-D	x	17	0	1	1	0	0	7	14	6	0	5	6	3	0	0
George's Morrison Farm	LAL 19-A	x	15	7	3	4	7	0	7	16	4	5	3	8	3	0	2
George's Morrison Farm	LAL 19-B	x	17	8	0	0	6	0	9	2	0	0	8	1	0	0	0
George's Morrison Farm	LAL 19-C	x	19	6	1	1	4	0	0	11	0	0	11	6	1	0	0
George's Morrison Farm	LAL 19-D	x	19	1	1	1	4	0	0	18	3	0	14	3	1	1	0
Tyson's Old Research Farm	LAL 20-A	x	19	7	0	0	2	0	6	18	2	2	16	0	0	0	0
Tyson's Old Research Farm	LAL 20-B	0	19	0	4	1	0	0	5	17	1	2	17	2	0	0	1
Tyson's Old Research Farm	LAL 20-C	x	20	4	0	0	1	1	1	19	0	0	19	0	3	0	1
Nubbie Farm	LAL 21-A	x	13	0	1	0	1	0	1	17	6	0	5	0	0	0	0
Nubbie Farm	LAL 21-B	x	18	0	1	2	10	1	2	15	11	0	15	0	3	0	0
Nubbie Farm	LAL 21-C	0	20	2	1	0	0	0	3	20	20	2	19	0	3	0	0
Nubbie Farm	LAL 21-D	x	18	0	0	0	1	0	0	18	6	0	4	0	0	0	2
Bill Engleman Farm	LAL 22-A	0	14	0	0	0	0	0	0	19	2	0	4	0	0	0	0
Bill Engleman Farm	LAL 22-B	0	15	0	0	0	0	0	1	19	6	0	2	0	0	0	2
Bill Engleman Farm	LAL 22-C	0	5	0	0	0	0	0	0	16	0	0	0	0	0	0	0
Bill Engleman Farm	LAL 22-D	0	9	0	0	0	0	0	0	20	2	0	1	0	0	0	0
Ricky Reed Farm	LAL 23-A	x	7	1	0	0	6	0	0	20	1	0	5	0	0	0	4
Ricky Reed Farm	LAL 23-B	0	18	0	0	0	0	0	0	19	0	0	0	0	0	0	2
Ricky Reed Farm	LAL 23-C	0	6	0	0	0	0	0	0	16	0	0	0	0	0	0	0
Ricky Reed Farm	LAL 23-D	x	9	1	0	0	0	0	0	18	0	0	2	0	0	0	0

TABLE 1

LIST OF FIELD ISSUES OBSERVED 2006 - 2007
ILLINOIS RIVER WATERSHED
SOIL SAMPLING

Farm Name	*Soil Sample*	*Post Driver Dropped on Cow Manure*	*Mixing of Sample Depths*	*One Core Collected From Each Sub-Sample Location*	*Two of More Cores Collected From Each Sub-Sample Location*	*Touched Sample With or Without Nitrile Gloves*	*Less Than 6" Recovered, CDM Unclear What Depth Soil is From But Samples Anyway*	*Visible Cow Manure on Sampler Immediately Prior to Sample Collection*
Bill Anderson Section 30	LAL 5-A	2	0	0	20	20	0	0
Julie Anderson-Chancellor Farm	LAL 5-B	0	1	0	20	9	2	0
Julie Anderson-Chancellor Farm	LAL 5-C	0	3	0	20	9	0	0
Julie Anderson-Chancellor Farm	LAL 5-D	0	0	0	20	7	1	0
Anderson Hen Farm # 41	LAL 6-A	0	0	0	20	2	0	0
Anderson Hen Farm # 41	LAL 6-B	0	0	0	20	0	0	0
Anderson Hen Farm # 41	LAL 6-C	0	0	0	20	10	0	0
Anderson Hen Farm # 41	LAL 6-D	0	0	0	20	9	0	0
Pigeon Family Farm	LAL 7-A	0	1	1	19	20	0	0
Pigeon Family Farm	LAL 7-B	1	5	0	20	20	0	0
Pigeon Family Farm	LAL 7-C	0	1	0	20	20	0	0
Pigeon Family Farm	LAL 7-D	0	0	0	20	20	0	0
Ren Butler Farm	LAL 8-A	1	0	0	20	14	0	0
Ren Butler Farm	LAL 8-B	0	0	0	20	20	0	0
Ren Butler Farm	LAL 8-C	0	20	0	20	0	0	0
Ren Butler Farm	LAL 8-D	0	20	0	20	4	0	0
Reed Farm	LAL 9-A	0	2	1	19	7	0	0
Reed Farm	LAL 9-B	0	2	1	19	6	1	1
Reed Farm	LAL 9-C	0	20	20	0	2	0	0
Reed Farm	LAL 9-D	0	0	0	20	20	0	0
Green Country Farms	LAL 10-A	0	0	0	20	4	0	0
Green Country Farms	LAL 10-B	0	0	0	20	11	1	0
David Wofford Farm	LAL 11-A	0	0	0	20	8	0	0
David Wofford Farm	LAL 11-B	1	0	0	20	8	0	0
David Wofford Farm	LAL 11-C	0	0	0	20	7	0	0
David Wofford Farm	LAL 11-D	0	2	0	20	4	1	0

Sampling Information Produced by Conestoga-Rovers Associates

TABLE 1

LIST OF FIELD ISSUES OBSERVED 2006 - 2007
ILLINOIS RIVER WATERSHED
SOIL SAMPLING

Farm Name	*Soil Sample*	*Post Driver Dropped on Cow Manure*	*Mixing of Sample Depths*	*One Core Collected From Each Sub-Sample Location*	*Two of More Cores Collected From Each Sub-Sample Location*	*Touched Sample With or Without Nitrile Gloves*	*Less Than 6" Recovered, CDM Unclear What Depth Soil is From But Samples Anyway*	*Visible Cow Manure on Sampler Immediately Prior to Sample Collection*
McGarrah Farms	LAL 12-A	0	0	0	20	1	0	0
McGarrah Farms	LAL 12-B	0	0	20	0	0	0	0
McGarrah Farms	LAL 12-C	0	1	20	0	0	0	0
McGarrah Farms	LAL 12-D	1	1	20	0	0	0	0
Collins Farm	LAL 13-A	0	20	20	0	0	0	0
Collins Farm	LAL 13-B	0	0	20	0	1	0	0
Collins Farm	LAL 13-C	0	2	0	20	4	0	0
Collins Farm	LAL 13-D	0	0	20	0	3	0	0
Glen Farm	LAL 14-A	1	0	0	0	2	0	0
Glen Farm	LAL 14-B	0	0	1	19	0	0	0
Glen Farm	LAL 14-C	1	1	0	20	0	0	0
Glen Farm	LAL 14-D	0	6	20	0	0	0	0
2-Saun Farm	LAL 15-A	0	0	20	0	0	0	0
2-Saun Farm	LAL 15-B	0	0	0	20	0	0	0
2-Saun Farm	LAL 15-C	0	0	20	0	2	0	0
2-Saun Farm	LAL 15-D	0	0	15	5	1	0	0
Bill Schwabe Farm	LAL 16-A	0	0	20	0	0	0	0
Bill Schwabe Farm	LAL 16-B	0	0	0	20	4	0	0
Bill Schwabe Farm	LAL 16-C	0	0	20	0	0	0	0
Bill Schwabe Farm	LAL 16-D	0	1	20	0	0	0	1
Woffard Farm (rented)	LAL 17-A	0	0	20	0	0	0	0
Woffard Farm (rented)	LAL 17-B	0	1	20	0	0	0	0
Woffard Farm (rented)	LAL 17-C	0	0	0	20	3	0	0
Woffard Farm (rented)	LAL 17-D	0	0	20	0	0	0	0
Billy Ray Anderson Farm	LAL 18-A	0	0	0	20	15	0	0
Billy Ray Anderson Farm	LAL 18-B	0	1	20	0	9	0	0

TABLE 1

LIST OF FIELD ISSUES OBSERVED 2006 - 2007
ILLINOIS RIVER WATERSHED
SOIL SAMPLING

Farm Name	*Soil Sample*	*Post Driver Dropped on Cow Manure*	*Mixing of Sample Depths*	*One Core Collected From Each Sub-Sample Location*	*Two of More Cores Collected From Each Sub-Sample Location*	*Touched Sample With or Without Nitrile Gloves*	*Less Than 6" Recovered, CDM Unclear What Depth Soil is From But Samples Anyway*	*Visible Cow Manure on Sampler Immediately Prior to Sample Collection*
Billy Ray Anderson Farm	LAL 18-C	0	0	20	0	12	0	0
Billy Ray Anderson Farm	LAL 18-D	0	20	20	0	3	0	0
George's Morrison Farm	LAL 19-A	0	12	0	7	6	0	
George's Morrison Farm	LAL 19-B	2	16	0	0	4	0	
George's Morrison Farm	LAL 19-C	0	2	0	0	0	0	
George's Morrison Farm	LAL 19-D	0	5	0	0	1	0	
Tyson's Old Research Farm	LAL 20-A	0	7	1	0	4	0	
Tyson's Old Research Farm	LAL 20-B	0	8	0	1	7	1	
Tyson's Old Research Farm	LAL 20-C	0	2	0	1	3	0	
Nubbie Farm	LAL 21-A	1	1	0	0	5	0	
Nubbie Farm	LAL 21-B	0	1	0	0	14	0	
Nubbie Farm	LAL 21-C	0	2	0	0	15	0	
Nubbie Farm	LAL 21-D	0	0	0	0	0	0	
Bill Engleman Farm	LAL 22-A	0	0	0	0	5	0	
Bill Engleman Farm	LAL 22-B	0	1	0	0	1	1	
Bill Engleman Farm	LAL 22-C	0	0	0	0	0	0	
Bill Engleman Farm	LAL 22-D	0	0	0	0	4	0	
Ricky Reed Farm	LAL 23-A	0	0	0	0	0	0	
Ricky Reed Farm	LAL 23-B	0	0	0	0	0	0	
Ricky Reed Farm	LAL 23-C	0	0	0	0	1	0	
Ricky Reed Farm	LAL 23-D	0	0	0	0	1	0	

TABLE 1

LIST OF FIELD ISSUES OBSERVED 2006 - 2007
ILLINOIS RIVER WATERSHED
WATER SAMPLING

Farm Name	*Water Sample*	*Groundwater Sample Collected Immediately Without Purging*	*Groundwater Sample Collected Directly From Garden Hose*	*Groundwater Sample Collected Directly From Spigot Without Sterilization*	*Pump Used to Sample Spring Discharges Upstream of Spring*	*Cattle in Spring*	*Use of Un-Sterilized Bottles for Bacteria Samples*	*YSI Meter Not Sterilized Prior to Dipping in Spring*	*CDM Using Un-Preserved Bottles*	*CDM Stepped in Spring After Walking Down Path With Cow Manure and Stir up Sediment Upstream of Sample Location*
McGarrah Farms	GW-...-001									
Bill Anderson Section	SW-...-001				x	x	x	x		
Collins Farm	GW-...-002								x	
2-Saun Farm	SW-...-003					x				x
2-Saun Farm	GW-...-004	* purged for 5-10min	x							
Glen Farm	GW-...-005	* purged for 15min		x						
Bill Schwabe Farm	GW-...-006	x								
Bill Schwabe Farm	GW-...-007	x	x							
Bill Schwabe Farm	SW-...-008				x					
Bill Schwabe Farm	SW-...-009					x				

Sampling Information Produced by Conestoga-Rovers Associates

TABLE 1

LIST OF FIELD ISSUES OBSERVED 2006 - 2007
ILLINOIS RIVER WATERSHED
LITTER SAMPLING

Farm Name	*Litter Sample*	*Sample Not Mixed Thoroughly*	*Number of Samples Against Wall*	*Number of Samples Under Feeders*	*Number of Samples Under Water Line*	*Number of Samples in Middle*	*Total Sub-Samples Collected*	*CDM Personnel with Fingers in Sample Container*	*Sub-Samples Collected in Tracks of Cage Handling Machine*	*Sample Dropped on Poultry House Floor was Retrieved and Included in Composite*	*Full Litter Depth Not Recovered in Sub-Samples*	*Part of House Dirt Floor Collected in Composite*	*Two Samples From Same Sub-Sample Location*	*Inconsistent Sub-Sample Due to Trimming of Litter*	*Mix Sample and Fill Jar with Hands*
Pigeon Family Farm	FAC-01	x					22				x				x
Loftin Farm	FAC-02	x	6	4	4	3	17	x			x			x	x
Reed Farm	FAC-03						18		x						
2-Saun Farm	FAC-04	x					18				x				
Glen Farm	FAC-05		4	4	4	4	16		x						
Green Country Farms	FAC-06		7	5	4	2	18			3 times	x	x			
McGarrah Farms	FAC-07	x	6	6	4	2		x	x		x			x	
Bob Schwabe Farm	FAC-08		8	4	3	3	18	x			x	x	x		
Billy Ray Anderson - Sect 30	FAC-09		3	7	6	2	18	x			x				
Julie Anderson-Chancellor	FAC-10		3	7	4	2	16	x			x			x	
George's Morrison Farm	FAC-11	x						x			x			x	
Nubbie Farm	FAC-12	x						x	x		x			x	
O'Leary Farm	FAC-13	x						x	x		x			x	
Masters Turkey House	FAC-14	x						x			x			x	
Butler Tyson Green Valley Complex 9	FAC-15	x						x	x		x			x	
Ricky Reed Farm	FAC-16	x						x			x				
Butler Tyson Green Valley Complex 12	FAC-17	x						x			x				

Sampling Information Produced by Conestoga-Rovers Associates

APPENDIX A

CURRICULUM VITAE - JAY CHURCHILL, P. ENG.

JAY A. CHURCHILL, P. Eng.

EDUCATION

B.Sc.(Eng.)	University of Guelph, Water Resources Engineering, 1985
Other Courses:	Conservation Planning, Part 2 (Modules 6-8) USDA-NRCS, October 2006
	Comprehensive Nutrient Management Plan Development Course, Iowa State University, Dept. of Agricultural and Biosystems Engineering, November 2005
	Conservation Planning, Part 1(Modules 1-5) - USDA-NRCS, February 2005
	Michigan/EPA Asbestos Building Inspector, Initial Training Course, Jensen Environmental Training Services, Detroit, Michigan, November 2001
	Conducting Comprehensive Environmental Property Assessments, Department of Engineering Professional Development, University of Wisconsin – Extension, May 1993
	Understanding Remediation, Department of Engineering Professional Development, University of Wisconsin – Extension, March 1990
	40-hour OSHA HAZWOPER training course (1987) and annual 8-hour refresher courses complying with 29 CFR 1910.120
	CNMP Element Writer Certification for Manure and Wastewater Handling and Storage, Iowa State University, Dept. of Agriculture and Biosystems Engineering, September 2007
	CNMP Element Writer Certification for Land Treatment Practices, Iowa State University, Dept. of Agriculture and Biosystems Engineering, September 2007
	CNMP Element Writer Certification for Nutrient Management - courses in progress

EMPLOYMENT

1993-Present	Project Manager Conestoga-Rovers & Associates
1990-92	Project Coordinator, Conestoga-Rovers & Associates
1986-90	Project Engineer, Conestoga-Rovers & Associates
1985-86	Junior Engineer, Totten Sims Hubicki Associates
1985	Environmental Technician, Ontario Ministry of the Environment

AFFILIATIONS

Association of Professional Engineers of Ontario

CURRENT POSITION WITH CRA

- Project Manager/Senior Engineer:
  - Responsible for management of all aspects of environmental and agricultural engineering projects, including investigations and assessments; environmental and civil construction; remediation, contract management; cost management; and invoicing to Clients

- Provides project management and technical assistance in CRA Agricultural Services Group. Prepares Comprehensive Nutrient Management Plans (CNMPs); prepares work plans for agricultural engineering work, including conducting environmental assessments and identification of agricultural best management practices; conducts environmental assessments; and provides technical oversight of agricultural environmental investigation being conducted by a third party
- Ensures engineering projects are completed in a technically sound manner
- Coordinates effective interaction of various engineering and scientific groups and disciplines, such as engineering, agricultural services, hydrogeology, chemistry, and technical support, to promote successful project completion. Reviews work product of various groups to ensure project goals are achieved
- Arranges for the availability of appropriate personnel and resources
- Responsible for communication with regulatory agencies, client, and the project team

PROFILE OF PROFESSIONAL ACTIVITIES

- *Agricultural Services*
  - managed the completion of environmental assessments and identification of best management practices (BMPs) for surface water and groundwater protection at >200 swine facilities in North Carolina. Developed detailed priority ranking system for BMP implementation, which ensures BMPs will be implemented in an order which achieves maximum environmental benefits in the most cost effective manner. Prepared detailed BMP recommendation report
  - prepared Comprehensive Nutrient Management Plans (CNMP) for several dairy and beef farms in Wisconsin
  - researched and prepared report on Regulatory Foresight for the Biofuel Industry
  - engineering QA oversight of HDPE liner installation for 10-acre agricultural waste storage pond in Oklahoma
  - received CNMP Element Writer certification for Manure and Wastewater Handling and Storage, Iowa State University
  - received CNMP Element Writer certification for Land Treatment Practices, Iowa State University
  - received certification for Conservation Planning, Parts 1 and 2, from United States Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS)
  - through course work and attending training programs, working towards achieving full certification with USDA-NRCS as a Technical Services Provider and certified CNMP Planner
- ***Design and Project Management of Remedial Construction***
  - Doepke-Holliday Superfund Site, Johnson County, Kansas (Superfund Site)
    - designed an impermeable multi-layer cap (synthetic liner and drainage net, soil, vegetative cover) over 35-acre site with significant grades
    - managed remedial construction activities associated with impermeable cap construction
    - currently managing long-term groundwater monitoring program, operation and maintenance (O&M) program, and associated USEPA reporting requirements
  - Former PCB Capacitor Manufacturing Plant, Indiana (USEPA and IDEM Site)
    - designed and managed remedial measures for the multi-phase cleanup of PCB-contaminated soils, creek sediments and concrete. Remedial measures included extensive soil excavation (60,000 c.y.); sequenced creek water diversion and sediment excavation; synthetic liner installations; PCB-capacitor segregation and packaging; concrete demolition; extensive

shoring installation; building dismantling and reconstruction; off-site disposal of PCB-contaminated soils and sediments; and surface restoration

- Closure of Numerous Solid Waste Disposal Areas
  - designed remedial measures including excavation of solid wastes and codisposed soil; segregation of wastes from codisposed soil; segregation and off-site disposal or recycling of waste materials by waste type; backfilling of segregated soil; and surface restoration activities
  - managed remedial construction activities
  - Specific examples of key solid waste disposal area closure projects completed include:
    1. Lakeside Memorial Park, Miami, Florida, U.S.A. (100,000 c.y. of solid waste and soil) (1998 – 1999)
    2. Camposanto De Cristo Rescucitado, Ponce, Puerto Rico, U.S.A. (55,000 c.y. of solid waste and soil) (1997 - 1998)
    3. El Senorial Memorial Park, Rio Piedras, Puerto Rico, U.S.A. (5,700 c.y. of solid waste and soil) (1997)
    4. Spring Hill Cemetery, Nashville, Tennessee, U.S.A. (2,100 c.y. of solid waste and soil) (2003)
    5. Semper Concrete, Butler, Pennsylvania, U.S.A. (5,600 c.y. of solid waste and soil) (1998)
    6. Hillcrest Memorial Gardens, Cleveland, Tennessee U.S.A. (12,000 c.y. of solid waste and soil) (2000)
    7. Valley of the Temples Memorial Park, Kaneohe, Oahu, Hawaii (8,700 c.y. of solid waste and soil) (1999)
- Industrial Plant, Buffalo, New York (NYSDEC Site)
  - designed an asphalt cap cover system and vegetated soil cover system over an active industrial site
  - managed remedial construction activities
- Asbestos Abatement (Numerous Sites in Canada)
  - prepared asbestos abatement specifications, some abatement to be completed in conjunction with facility renovation or demolition, and managed abatement projects
  - prepared asbestos management plans (AMPs) for asbestos to remain in place
- Industrial Plant, Wisconsin (WDNR Site)
  - managed remedial activities conducted at a former manufactured gas plant site with coal tar contamination, including groundwater interceptor drain construction; construction of a steel sheet pile groundwater barrier wall; and construction of a groundwater pump and treatment system
- CIW Site, Romulus, Michigan (USEPA Site)
  - managed remedial activities conducted at a former oil recycling facility, including PCB-contaminated oil removal; sludge solidification and removal; tank demolition; and drummed waste repackaging and securement operations

- ***Nature and Extent of Contamination Investigations***
  - Former PCB Capacitor Manufacturing Plant, Indiana (USEPA and IDEM Site)
    - conducted an extensive PCB surface and subsurface soil and sediment sampling program; groundwater and surface water investigations; concrete coring; wipe sampling; and PCB air sampling
  - CIW Site, Romulus, Michigan (USEPA Site)

  - drum sampling in a Level B work environment; tanked liquids sampling at this former oil recycling facility contaminated with PCBs
- Chemical Manufacturing Site, Charles City, Iowa
  - lagoon sludge sampling
- Numerous Underground Storage Tank (UST) Sites in the United States and Canada
  - confirmatory soil sampling and groundwater investigations for UST closures

- ***Technical Review and Comment/Negotiation of Agency Orders/Consent Decrees/Remedial Actions***
  - Doepke-Holliday Superfund Site, Johnson County, Kansas (Superfund Site)
    - Consent Decree
  - CIW Site, Romulus, Michigan (USEPA Site)
    - CERCLA 106 Order
  - Shavers Farm Site, Walker County, Georgia (USEPA Site)
    - Removal Action completed by USEPA
  - Novak Farm Site, New York (NYSDEC Site)
    - Removal Action completed by NYSDEC

- ***Expert Testimony***
  - Doepke-Holliday Superfund Site, Johnson County, Kansas (Superfund Site)
    - participated in mediation sessions with client, remedial contractors, and judge to resolve large remedial construction contract settlement dispute

- ***Cost Allocation in Support of Negotiations/Settlements***
  - CIW Site, Romulus, Michigan (USEPA Site)
    - evaluated costs incurred by client for remedial work required to be completed under a CERCLA 106 Order issued by USEPA, and assisted in preparation of client claim for reimbursement from USEPA
  - Shavers Farm Site, Walker County, Georgia (USEPA Site)
    - critically evaluated USEPA expenditures associated with a large Removal Action completed by USEPA for which USEPA was seeking reimbursement from client
  - Novak Farm Site, New York (NYSDEC Site)
    - critically evaluated NYSDEC expenditures associated with a large Removal Action completed by NYSDEC for which NYSDEC was seeking reimbursement from client
  - Large Energy Company (U.S.)
    - conducted a detailed evaluation of actual and potential environmental liabilities associated with in excess of 1,000 active and former energy company facilities

- ***Miscellaneous Technical Work***
  - highly skilled in construction contract technical interpretation, enforcement, and administration
  - prepared many contract documents and specifications for various investigative and remedial programs
  - prepared work plans for hazardous waste and solid waste remedial and investigative programs

- prepared detailed engineering reports and environmental sampling and analyses reports for numerous hazardous waste and solid waste remedial construction projects, for submission to government agencies and industry
- prepared detailed cost estimates for remedial programs and environmental monitoring programs, under multiple scenarios and cost expenditure time frames
- prepared Environmental Indicator Determination (Current Human Exposures Under Control, and Migration of Contaminated Groundwater Under Control) documents meeting the requirements of USEPA's RCRA program
- prepared Health and Safety Plans for hazardous waste investigative and remedial programs
- prepared Spill Prevention Control and Countermeasure Plans (SPCCPs) and Stormwater Pollution Prevention Plan (SPPP)
- evaluated chemical composition of soils, groundwater, surface water, and waste materials, based on environmental and regulatory criteria
- designed an explosive gas monitoring system for a sanitary landfill

- *Key Field Remedial Construction and Related Experience*
  - supervised extensive remedial cleanup activities of PCB-contaminated soils, creek sediments and concrete. Remedial measures included extensive soil and sediment excavation (60,000 c.y.) and off-site disposal; sequenced creek water diversion and sediment excavation; synthetic liner installations; PCB-capacitor segregation and packaging; concrete demolition; extensive shoring installation to accommodate excavation to depth of 18 feet; building dismantling and reconstruction; and surface restoration
  - supervised PCB-transformer decontamination and removal operations; PCB-contaminated soil removal; removal of tanked PCB-contaminated oils; PCB-capacitor packaging and removal; storage tank dismantling; and building demolition
  - provided technical assistance and oversight during drum and contaminated soil excavation activities at a large drummed waste disposal site
  - supervised segregation of hazardous liquid and solid chemicals in a supplied air modified "Level A" work environment within a former metal plating facility
  - coordinated drum securement, sampling, waste classification, and drum removal operations at several sites
  - supervised concrete coring operations inside a PCB-contaminated active plant facility
  - supervised regrading operations and the construction of an impervious clay cover over an industrial landfill
  - collected numerous soil, sediment, surface water, groundwater, concrete core, wipe, sludge, and air samples at numerous hazardous waste sites in the United States and Canada

- *Other Training and Unique Experience*
  - former CRA internal Quality System (ISO 9001) auditor
  - considerable experience in the installation and testing of synthetic liner systems
  - experience in sheet pile installation for hydraulic containment and structural support
  - experience in angle borings for subsurface soil sampling beneath structures
  - completed Red Cross emergency first aid training and CPR courses

APPENDIX B

CURRICULUM VITAE - JAY CHURCHILL, P. ENG.
(NOVEMBER 25, 2008)

JAY A. CHURCHILL, P. Eng.

EDUCATION

B.Sc.(Eng.)	University of Guelph, Water Resources Engineering, 1985
Other Courses:	CNMP Element Writer Certification for Nutrient Management, Iowa State University, Dept. of Agriculture and Biosystems Engineering, May 2008
	CNMP Element Writer Certification for Manure and Wastewater Handling and Storage, Iowa State University, Dept. of Agriculture and Biosystems Engineering, September 2007
	CNMP Element Writer Certification for Land Treatment Practices, Iowa State University, Dept. of Agriculture and Biosystems Engineering, September 2007
	Conservation Planning, Part 2 (Modules 6-8) USDA-NRCS, October 2006
	Comprehensive Nutrient Management Plan Development Course, Iowa State University, Dept. of Agricultural and Biosystems Engineering, November 2005
	Conservation Planning, Part 1 (Modules 1-5) - USDA-NRCS, February 2005
	Michigan/EPA Asbestos Building Inspector, Initial Training Course, Jensen Environmental Training Services, Detroit, Michigan, November 2001
	Conducting Comprehensive Environmental Property Assessments, Department of Engineering Professional Development, University of Wisconsin – Extension, May 1993
	Understanding Remediation, Department of Engineering Professional Development, University of Wisconsin – Extension, March 1990
	40-hour OSHA HAZWOPER training course (1987) and annual 8-hour refresher courses complying with 29 CFR 1910.120

EMPLOYMENT

1993-Present	Project Manager Conestoga-Rovers & Associates
1990-92	Project Coordinator, Conestoga-Rovers & Associates
1986-90	Project Engineer, Conestoga-Rovers & Associates
1985-86	Junior Engineer, Totten Sims Hubicki Associates
1985	Environmental Technician, Ontario Ministry of the Environment

AFFILIATIONS

Association of Professional Engineers of Ontario

CURRENT POSITION WITH CRA

Project Manager/Senior Engineer:

- Responsible for management of all aspects of environmental and agri-environmental engineering projects, including investigations and assessments; environmental and civil construction; remediation, contract management; cost management; and invoicing to Clients

- Provides project management and technical assistance in CRA Agricultural Services Group. Prepares Comprehensive Nutrient Management Plans (CNMPs); prepares work plans for environmental engineering work, including conducting environmental assessments and identification of agricultural best management practices; conducts environmental assessments; and provides technical oversight of agricultural environmental investigation being conducted by a third party
- Ensures engineering projects are completed in a technically sound manner
- Coordinates effective interaction of various engineering and scientific groups and disciplines, such as engineering, agricultural services, hydrogeology, chemistry, and technical support, to promote successful project completion. Reviews work product of various groups to ensure project goals are achieved
- Arranges for the availability of appropriate personnel and resources
- Responsible for communication with regulatory agencies, client, and the project team

PROFILE OF PROFESSIONAL ACTIVITIES

Agricultural Services

- managed the completion of environmental assessments and identification of best management practices (BMPs) for surface water and groundwater protection at >200 swine facilities in North Carolina. Developed detailed priority ranking system for BMP implementation, which ensures BMPs will be implemented in an order which achieves maximum environmental benefits in the most cost effective manner. Prepared detailed BMP recommendation report
- prepared Comprehensive Nutrient Management Plans (CNMP) for several dairy and beef farms in Wisconsin
- researched and prepared report on Regulatory Foresight for the Biofuel Industry
- engineering QA oversight of HDPE liner installation for 10-acre agricultural waste storage pond at a large dairy in Oklahoma
- received CNMP Element Writer certification for Nutrient Management, Iowa State University
- received CNMP Element Writer certification for Manure and Wastewater Handling and Storage, Iowa State University
- received CNMP Element Writer certification for Land Treatment Practices, Iowa State University
- received certification for Conservation Planning, Parts 1 and 2, from United States Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS)
- through course work and attending training programs, working towards achieving full certification with USDA-NRCS as a Technical Services Provider and certified CNMP Planner

Design and Project Management of Remedial Construction

- Doepke-Holliday Superfund Site, Johnson County, Kansas (Superfund Site)
  - designed an impermeable multi-layer cap (synthetic liner and drainage net, soil, vegetative cover) over 35-acre site with significant grades
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  - Removal Action completed by USEPA
- Novak Farm Site, New York (NYSDEC Site)
  - Removal Action completed by NYSDEC

Expert Testimony

- State of Oklahoma vs. Tyson Foods, Inc. et al.
  - prepared expert reports and testified in U.S. District Court regarding environmental media sampling oversight observations
- Doepke-Holliday Superfund Site, Johnson County, Kansas (Superfund Site)
  - participated in mediation sessions with client, remedial contractors, and judge to resolve large remedial construction contract settlement dispute

Cost Allocation in Support of Negotiations/Settlements

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- former CRA internal Quality System (ISO 9001) auditor
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November 25, 2008